Mini System

FW391C/22

FW396C/22

Service
Service
Service

Service Manual

ReWritable COMPACT DIGITAL AUDIO

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CLASS 1
LASER PRODUCT

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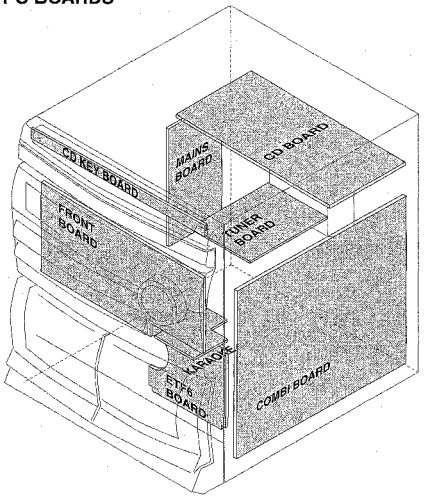
PHILIPS

LOCATION OF PC BOARDS



VERSION VARIATIONS:

Type /Versions: / Features & Board in used:	FW391C /22	FW396C /22
Dolby B		
Incredible Surround	x	x
Karaoke		
News	x	x
RDS	x	x
CD Text		
Rotary Encoder (volume control)	x	x
Voltage Selector		
Aux Input	x	x
Digital Output	x	x
Headphone Socket	x	x
Line Output		
Subwoofer Output	x	x
Surround Output		
Matrix Surround Loudspeakers		
Tuner board - ECO5 Sys		
Tuner board - Tuner 95	x	x
Combi board - Supply 12W		
Combi board - Supply 18W	x	x

SPECIFICATIONS

GENERAL:

Mains voltage : 220-230V for /22
Mains frequency : 50Hz
Power consumption : < 15W at Standby
44W at 1/8 rated power out
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 330mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34
Grid : 50kHz (& 30kHz for /34
100kHz for /37
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75ohm coaxial
300ohm click fit for /37
Sensitivity at 26dB S/N : < 7µV
Selectivity at 600kHz bandwidth : > 50dB
Image rejection : > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz : < 3% [< 2%]
-3dB Limiting point : < 8µV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB [> 26dB]

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/37
Grid : 9kHz
10kHz for /21/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5%

LW

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : [< 6.0mV/M]
Selectivity at 18kHz bandwidth : [> 22dB]
IF rejection : [> 40dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 5%]

AMPLIFIER:

Output power [1] : 2 x 25W @ 6 ohm ± 1dB
Frequency response within ±3dB : 50Hz-15kHz
Dynamic Bass Boost : DBB ON, DBB Off [2]
Incredible Surround : IS, IS Off [2]
Digital Sound Control : Jazz, Techno, Optimal, Rock [2]
Input Aux-in : 700mV ± 3dB at 600ohm
Output Sub-woofer : 1.5V ± 3dB at 22kohm
Headphone : 15mW at 32ohm
Digital out : 44.1kHz IEC958

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76 cm/sec ± 2%
1.6 x 4.76 cm/sec
Wow and flutter : < 0.4% DIN
Fast-wind/rewind time C60 : 130 sec
Bias system : 75kHz ± 10kHz
Rec/Pb frequency response within 8dB : 80Hz - 12.5kHz
Signal to noise ratio
Normal (IEC type I) : > 48dBA
Chrome (IEC type II) : > 52dBA

COMPACT DISC:

Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 2dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Total Harmonic Distortion : < 0.003%
Channel Unbalance : < 1dB
Channel separation at 1kHz : > 60dB
De-emphasis : 0 or 15/50 µS (Switched by subcode on the disc)

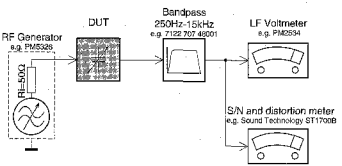
[....] Values indicated are for "Tuner 95 Board" only

[1] 1kHz, 10% THD

[2] Frequency response in each setting is software controlled.

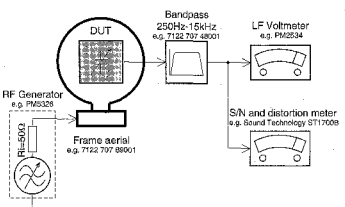
MEASUREMENT SETUP

Tuner FM



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

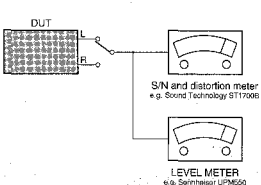
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday's cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

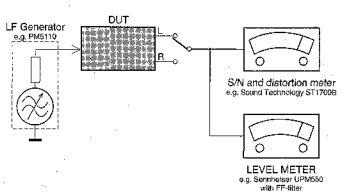
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



SERVICE AIDS

Service Tools:

Universal Torx driver holder	4822 395 91019
Torx bit T10 150mm	4822 395 50456
Torx driver set T6 - T20	4822 395 50145
Torx driver T10 extended	4822 395 50423

Cassette:

SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

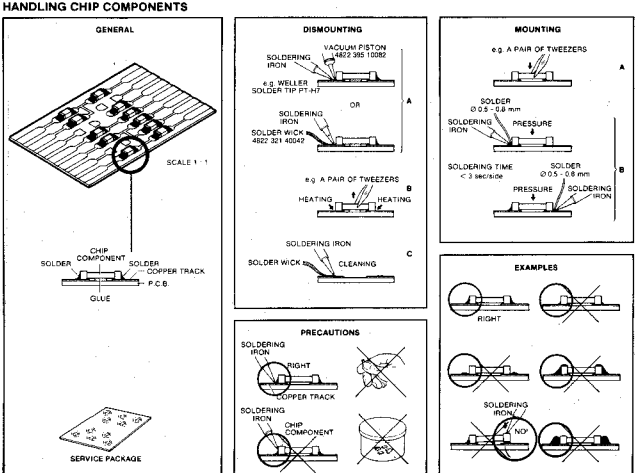
Compact Disc:

SBC426/426A Test disc 5 + 5A	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz	4822 397 30155
SBC429 Audio Signals disc	4822 397 30184
Dolby Pro-logic Test Disc	4822 395 10216

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm	4822 466 10953
Anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connector box (1MΩ)	4822 320 11307
Extension cable (to connect wristband to conn. box)	4822 320 11305
Connecting cable (to connect table mat to conn. box)	4822 320 11306
Earth cable (to connect product to mat or box)	4822 320 11308
Complete kit ESD3 (combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS



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ESD

(GB) **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

(F) **ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) **WARNUNG**

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparsturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(NL) **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione delle più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

(F)
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)
Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

(GB) **Warning !**
Invisible laser radiation when open.
Avoid direct exposure to beam.

(S) **Varning !**
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(SF) **Varoitus !**
Avatussa laitteesse ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

(DK) **Advarse !**
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

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GENERAL INFORMATION

General Information

- ***The type plate (which contains the serial number) is located at the rear of the system.***
- ***Recording is permissible if copyright or other rights of third parties are not infringed.***
- ***This product complies with the radio interference requirements of the European Community.***

Environmental information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials: cardboard (box), polystyrene foam (buffer) and polythene (bags, protective foam sheet).

Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

Accessories *(Supplied)*

- Remote control
- Batteries (2 x AA size) for remote control
- AM loop antenna
- FM wire antenna
- AC power cord

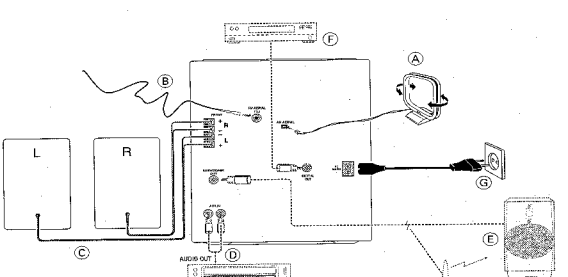
SAFETY INFORMATION

Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the system yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the system until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

PREPARATION

Rear Connections



PREPARATION

Ⓐ AM Loop Antenna Connection

Connect the supplied loop antenna to the AM ANTENNA terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

Ⓑ FM Wire Antenna Connection

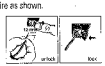
Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna

For better FM stereo reception connect an outdoor FM antenna to the FM ANTENNA 75 Ω terminal using a 75 Ω coaxial wire.

Ⓒ Speaker Connections

- Connect the right speaker to Front terminal R, with the red wire to + and the black wire to −.
- Connect the left speaker to Front terminal L, with the red wire to + and the black wire to −.
- Clip the stripped portion of the speaker wire as shown.



Ⓓ Connecting other equipment to your system

You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc or DVD player to the AUX IN terminals at the rear of the system.

Ⓔ Subwoofer Out Connection

You can connect either an optional active subwoofer or an optional wireless active subwoofer to the SUBWOOFER OUT terminal. The wireless system uses a radio frequency transmitter. The subwoofer reproduces just the low bass effect (e.g. explosions, the rumble of the spaceships, etc.). Be sure to follow the instructions supplied with the subwoofer unit.

Note:

– *Availability of wireless transmitter and its peripherals are subjected to the approval of local authorities. Please check with respective local safety or approving authority.*

Ⓕ Digital Out Connection

You can record the digital sound from the CD, through this output, on any audio equipment with digital input (e.g. CD Recorder, Digital Audio Tape (DAT) deck, Digital to Analog Converter and Digital Signal Processor).

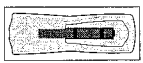
Connect one end of the cinch cable (not supplied) to the DIGITAL OUT socket and the other end to the audio equipment with digital input. When connecting the cinch cable, make sure it is fully inserted.

Ⓖ AC Power Supply

After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

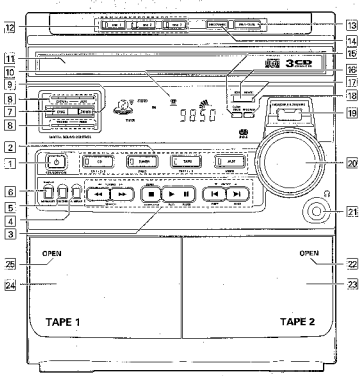
Inserting batteries into the Remote Control

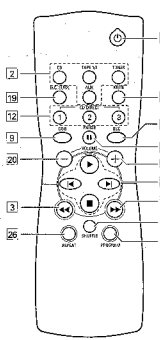
- Insert the batteries (Type R06 or AA) into the remote control as shown in the battery compartment.



- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement, use type R06 or AA batteries.

CONTROLS





Controls on the system and remote control

1 **STANDBY-ON**
– to switch the system on or to standby mode.
– to store radio stations automatically by pressing and holding for 5 seconds.

2 **SOURCE** : to select the following.
CD / (CD 1•2•3)
– to select CD mode. When CD in stop mode; to select the disc tray 1, 2 or 3.
TUNER / (BAND)
– to select Tuner mode. When in tuner mode; to select the waveband: FM, MW or LW.
TAPE / (TAPE 1• 2)
– to select Tape mode. When tape in stop mode; to select either tape deck 1 or 2.
AUX / (VIDEO)
– to select sound from an external source (e.g. TV, Laser Disc, DVD or VCR player).

3 **MODE SELECTION**
SEARCH ◄◄,►► (TUNING ◄◄,►►)
for CD ..... to search backward/ forward.
for TUNER .... to tune to a lower or higher radio frequency.
for TAPE ..... to rewind or f ast forward on tape deck 2 only.

STOP•CLEAR ■ (DEMO)
for CD ..... to stop CD playback or clear a program.
for TUNER .... to stop programming, *(on the system only)*
for TAPE ..... to stop playback or recording.
DEMO ..... to start or stop demonstration mode *(on the system only)* .

PLAY ► / PAUSE ▮▮
for CD ..... to start or interrupt playback.
for TAPE ..... to start playback.
PREV ⏮ / NEXT ⏭ (PRESET ▼ ▲)
for CD ..... to skip to the beginning of the current or previous/next track.
for TUNER .... to select a preset station in memory.

4 **AUTO REPLAY** *(available in tape deck 2 only)*
– to select playback mode either in continuous AUTO PLAY or ONCE only.

5 **RECORD**
– to start recording on tape deck 2 only.

6 **DUBBING**
– to dub a tape in normal or fast speed.

7 **DIGITAL SOUND CONTROL (DSC)**
– to select the desired sound effect : OPTIMAL, JAZZ, ROCK or TECHNO.

8 **DIGITAL SOUND CONTROL DISPLAY PANEL**
– to view the selected DSC display.

9 **DYNAMIC BASS BOOST (DBB)**
– to switch on bass boost to enhance bass response or to switch off bass boost.

10 **DISPLAY**
– to view the current setting of the system.

11 **CD CAROUSEL TRAY**

12 **CD DIRECT PLAY (DISC 1 / DISC 2 / DISC 3)**
– to select a CD tray for playback.

13 **OPEN•CLOSE**
– to open or close the CD carousel tray.

14 **DISC CHANGE**
– to change CD(s).

15 **CLOCK/TIMER**
– to view clock, set clock or timer.

16 **RDS**
– to select RDS data.

17 **NEWS!**
– to hear news at a preset time automatically.

18 **PROGRAM**
– to program CD tracks in CD mode or preset radio stations in tuner mode.

19 **INCREDIBLE SURROUND**
– to switch on or off the surround sound effect.

20 **VOLUME**
– to adjust the volume level.

21 🎧
– to connect headphones.

22 **OPEN**
– to open tape deck 2.

23 **TAPE DECK 2**

24 **TAPE DECK 1**

25 **OPEN**
– to open tape deck 1.

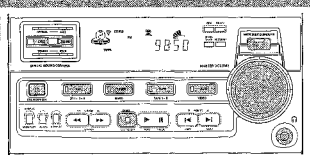
26 **REPEAT**
– to repeat a CD track.

27 **SHUFFLE**
– to play all the available discs and their tracks in random order.

28 **MUTE**
– to switch off the sound temporarily.

29 ⏻
– to switch the system to standby mode.

Notes for remote control:
- ***First select the source you wish to control by pressing one of the source select keys on the remote control (e.g. CD, TUNER, TAPE 1/2 or AUX).***
- ***Then select the desired function (PLAY, NEXT, etc.).***



Important:
Before you begin operating the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***When the system is switched on for the first time, the demonstration mode will start automatically.***

Note:
- *During the demonstration, if you press any source (or standby-on) button, the system will switch to the respective mode (or standby).*
- *When the system is switched to standby mode, the demonstration will resume five seconds later.*

To stop the demonstration mode
- Press and hold **STOP•CLEAR ■** *(on the system only)* for ***five seconds*** when the system is in demonstration mode.
  → The demonstration will stop.
  → The system will switch to standby mode.

Note:
- *Even though the AC power cord is removed from and reconnected to the wall socket, the demonstration will remain off until it is switched on again.*

To start the demonstration mode
- Press and hold **STOP•CLEAR ■** *(on the system only)* for ***five seconds*** when the system is in standby mode.
  → The demonstration will begin.

Easy Set

EASY SET allows you to store all available radio stations in a particular band (FM, MW or LW) automatically.

1 Press and hold **STANDBY•ON** *(on the system only)* for 5 seconds; when the system is in standby or demonstration mode.
  → "EASY SET" will be displayed and followed by "TUNER".
  → EASY SET will start with the last active band.
  → All available radio stations with sufficient signal strength will be stored or until 40 presets are filled.

2 The system will search once again for the first available RDS station and to set the RDS time automatically.

- When searching RDS station;
  → "SEARCH RDS STATION" will be displayed. If no RDS station is available, the program will exit automatically and "NO RDS STATION" will be displayed.
  → After a station is found, "EASY SET" will be displayed and followed by "TIME".
- When searching RDS time;
  → "SEARCH RDS TIME" will be displayed.
  → When RDS time is read, "RDS TIME" will be displayed. The current time is displayed for 2 seconds and will be stored automatically.

Notes :
- *When EASY SET is used, all previously stored radio stations will be erased.*
- *The last preset radio station or the first available RDS station will appear on the display when EASY SET is completed.*
- *If RDS station does not transmit RDS time within 90 seconds, the program will exit automatically and the display will show "NO RDS TIME".*

Switching the system ON

- Press **STANDBY•ON** *(on the system only)*, **CD**, **TUNER**, **TAPE** or **AUX**.

You can also switch on the system by pressing any one of the CD DIRECT PLAY buttons.

ENGLISH

Switching the system to standby mode

- Press **STANDBY•ON** again.
  → The system will switch to standby mode.

Selecting the Source

- Press the respective source selection button: **CD**, **TUNER**, **TAPE** or **AUX**.
  → The display indicates the selected source.

Note:

– *For an external source, make sure that you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals.*

Sound Control

Volume Adjustment

Adjust **VOLUME** to increase or decrease the sound level.

For Personal Listening

Connect the headphones plug to the ∩ socket at the front of the system. The speakers will be muted.

Digital Sound Control (DSC)

The DSC feature enables you to enjoy special sound effects that have preset equalizer settings, providing the best music reproduction.

- Press **DIGITAL SOUND CONTROL (DSC)** to select OPTIMAL, JAZZ, ROCK or TECHNO.
  → The Digital Sound Control display panel will light up respectively.
  → "OPTIMAL, JAZZ, ROCK or TECHNO" will be displayed.

Automatic DSC-DBB selection

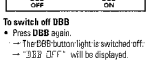
The best setting for the DBB is automatically generated for the respective DSC selection. You can manually select the DBB setting that best suits your listening environment.

DSC Selection	DBB On/Off
Optimal	On
Jazz	Off
Rock	Off
Techno	Off

Dynamic Bass Boost (DBB)

The DBB mode enhances the bass response.

- Press **DBB** to switch on bass response.
  → The DBB button lights up.
  → "DBB ON" will be displayed.



To switch off DBB

- Press **DBB** again.
  → The DBB button light is switched off.
  → "DBB OFF" will be displayed.

Note:

– *Some CDs or tapes might be recorded in high modulation. It may cause a distortion at high volume. If this occurs, switch off Incredible Surround, DBB or reduce the volume.*

Incredible Surround

Normal stereo sound is determined by the distance between the front speakers. When Incredible Surround is switched on, it magnifies the virtual distance between the front speakers for an incredibly wide, enveloping, stereo effect.

- Press **INCREDIBLE SURROUND** to switch on.
  → The INCREDIBLE SURROUND button lights up.
  → "IS" will be displayed.

To switch off Incredible Surround

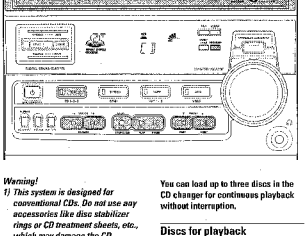
- Press **INCREDIBLE SURROUND** again.
  → The INCREDIBLE SURROUND button light is switched off.
  → "IS OFF" will be displayed.

***Mute** (only on remote control)*

This feature allows you to temporarily switch off the sound of the system without switching off the system when you require a moment of silence.

- Press **MUTE** on the remote control to switch off the sound.
  → "MUTE " will be displayed.
- Press **MUTE** again on the remote control or increase the **VOLUME** level to switch on the sound.

ENGLISH



Warning!

1) This system is designed for conventional CDs. Do not use any accessories like disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.

2) Do not load more than one disc into each tray.

3) When the CD changer is loaded with CD(s), do not turn over or shake the system. This may jam the changer.

You can load up to three discs in the CD changer for continuous playback without interruption.

Discs for playback

This system can play all audio CD, finalized audio CD-Recordable and finalized audio CD-Rewritable format discs.

DIGITAL AUDIO | DIGITAL VIDEO COMPATIBLE | DIGITAL AUDIO PLAYBACK ONLY

Loading the CD Changer

1 Press **CD** to select CD mode.
2 Press **OPEN•CLOSE**.
  → The CD compartment slides out.
3 Load a CD with the printed side up in the right tray.
- You can load another disc in the left tray.
- To load the third disc, press the **DISC CHANGE** button.
  → The CD changer carousel will rotate until the empty tray is ready for loading.
  → Playback will always start with the disc in the outer right disc tray.

4 Press **OPEN•CLOSE** to close the CD compartment.
  → The total number of tracks and playing time of the last selected disc appear on the display.

CD Direct Play

You can play a CD directly by pressing the **DISC 1**, **DISC 2** or **DISC 3** button. The CD player will stop at the end of playback of the selected disc.

– When the button is lighted, it indicates that there is a disc loaded in the disc tray.

Playing a CD

1 Press **PLAY** ► to start playback.
  → The disc tray, track number and elapsed playing time of the current track appear on the display.
- To interrupt playback, press **PAUSE** ❚❚.
  → The playing time flashes.
- To resume playback, press **PLAY** ► again.

2 To stop playback, press **STOP•CLEAR** ■.

Note:

– *All the available discs will play once, then stop. When the CD has stopped playing, the system will switch to the standby mode after 15 minutes if no button is pressed.*

Disc Change

You can change the outer 2 discs while the third inner disc is at the stop or playing mode.

1 Press **DISC CHANGE**
  → The CD compartment slides out.
2 Replace the discs in the left and right disc trays.
- If you press **DISC CHANGE** again during playback, the CD will stop playing.
  → The CD carousel tray will rotate until the inner tray is ready for changing.

3 Press **OPEN•CLOSE** to close the CD compartment.

Selecting a desired track

Selecting a desired track at the stop mode

1 Press **PREV** |◀ or **NEXT** ▶| until the desired track appears on the display.
2 Press **PLAY** ▶ to start playback.
→ The selected track number and elapsed playing time appear on the display.

Selecting a desired track during playback

1 Press **PREV** |◀ or **NEXT** ▶| until the desired track appears on the display.
→ The selected track number and elapsed playing time appear on the display.

- If you press **PREV** |◀ once it will skip to the beginning of the current track and play the track again.

Searching for a particular passage during playback

- Press and hold ◀◀ or ▶▶ until the desired passage is located.
→ The volume will be reduced.
- Play returns to normal when ◀◀ or ▶▶ is released.

Programming Tracks

Programming tracks of a loaded CD is possible in the stop mode. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

1 Load the desired discs in the disc trays.
2 Press **PROGRAM** to start programming.
→ The PROGRAM flag starts flashing.
3 Press the **CD** (CD 1•2•3) button to select the disc.
4 Press **PREV** |◀ or **NEXT** ▶| to select the desired track.
5 Press **PROGRAM** to store the track.
- Repeat steps 3 to 5 to store other discs and tracks.
6 Press **STOP•CLEAR** ■ once to end programming mode.
→ The total number of tracks programmed and total playing time appear on the display.

Notes:

– *If the total playing time is more than "99:59" or if one of the programmed tracks has a number greater than 30, then "- -:- -" appears in the display instead of the total playing time.*
– *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Playing the program

1 Press **PLAY** ▶ to start program playback.
→ "PLAY PROGRAM" appears on the display.
→ The track number and elapsed playing time of the current track will appear on the display.
- If you press **REPEAT** during program playback, the current track will be played repeatedly.
→ The REPEAT and PROGRAM flags will be displayed.
2 Press **STOP•CLEAR** ■ to stop program playback.

Note:

– *If you press any of the CD DIRECT PLAY button, the system will play the selected disc or track and the stored program will be ignored temporarily. The PROGRAM flag will also temporarily disappear from the display and then reappear when the playback for the selected disc ends.*

Reviewing the program

Reviewing of the program is only possible in the stop mode.

- Press **PREV** |◀ or **NEXT** ▶| repeatedly to review the programmed tracks.
- Press **STOP•CLEAR** ■ to exit review mode.

Erasing the program (in the stop mode)

- Press **STOP•CLEAR** ■ on the system.
→ "PROGRAM CLEARED" will be displayed.

Note:

– *The program will be erased when the system is disconnected from the power supply. If the CD carousel is opened, the tracks belonging to the outer two trays will be erased and the display will show "CLEARED".*

Repeat (only on remote control)

It will play the current track repeatedly.

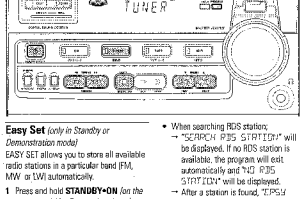
1 Press **REPEAT** during CD playback.
→ "REPEAT TRACK" will be displayed.
→ The REPEAT flag appears on the display.
- The track will now be played repeatedly until you press **STOP•CLEAR** ■
2 Press **REPEAT** again to resume normal playback.
→ The REPEAT flag disappears from the display.

Shuffle (only on remote control)

It will play all the available discs and their tracks in random order. Shuffle may also be used when tracks are programmed.

To shuffle all the discs and tracks

1 Press **SHUFFLE**.
→ "SHUFFLE" will be displayed.
→ The SHUFFLE flag, the disc and the track selected at random appear on the display.
- The discs and the tracks will now be played in random order until you press **STOP•CLEAR** ■
- If you press **REPEAT** during shuffling, the current track will be played repeatedly.
→ The REPEAT and SHUFFLE flags will be displayed.
2 Press **SHUFFLE** again to resume normal playback.
→ The SHUFFLE flag disappears from the display.



Easy Set (only in Standby or Demonstration mode)

EASY SET allows you to store all available radio stations in a particular band (FM, MW or LW) automatically.

1 Press and hold **STANDBY•ON** (on the system only) for 5 seconds; when the system is in standby or demonstration mode.
→ "EASY SET" will be displayed and followed by "TUNER".
→ EASY SET will start with the last active band.
→ All available radio stations with sufficient signal strength will be stored or until 40 presets are filled.
2 The system will search once again for the first available RDS station and to set the RDS time automatically.

- When searching RDS station;
→ "SEARCH RDS STATION" will be displayed. If no RDS station is available, the program will exit automatically and "NO RDS STATION" will be displayed.
→ After a station is found, "EASY SET" will be displayed and followed by "TIME".
- When searching RDS time;
→ "SEARCH RDS TIME" will be displayed.
→ When RDS time is read, "RDS TIME" will be displayed. The current time is displayed for 2 seconds and will be stored automatically.

Notes :

– *When EASY SET is used, all previously stored radio stations will be erased.*
– *The last preset radio station or the first available RDS station will appear on the display when EASY SET is completed.*
– *If RDS station does not transmit RDS time within 90 seconds, the program will exit automatically and the display will show "NO RDS TIME".*

Tuning to radio stations

1 Press **TUNER** to select TUNER mode.
→ "TUNER" will be displayed.
A few seconds later, the current frequency will be displayed.
2 Press **TUNER** (BAND) again to select the desired waveband - FM, MW or LW.
3 Press **TUNING** ◀◀ or ▶▶ for more than one second, then release.
→ The display will show "SEARCH" until a radio station with sufficient signal strength is found.
- Repeat this procedure until the desired station is reached.
- To tune to a weak station, briefly press **TUNING** ◀◀ or ▶▶ until the display shows the desired frequency and/or when the best reception has been obtained.

Storing Preset Stations

You can store up to 40 radio stations in the memory. When a preset radio station is selected, the preset number appears next to the frequency on the display.

Automatic programming

1 Press **TUNER**.
2 Press **TUNER** (BAND) again to select the desired waveband : FM, MW or LW.
3 Press **PROGRAM** for more than one second.
→ PROGRAM flag starts flashing and 'AUTO' will be displayed.
→ Every available station for the selected waveband will be stored automatically. The frequency and preset number will be displayed briefly.
→ The system will stop searching when all the available radio stations are stored or when the memory for 40 preset radio stations is used.
→ The system will remain tuned to the last stored preset radio station.

- Repeat the above procedure to store other preset radio stations for the other waveband. Remember to select the next available preset number before proceeding. If not, some of the preset radio stations may be erased.

Notes:

– *You can cancel the automatic programming by pressing PROGRAM or STOP•CLEAR ■ on the system only.*
– *If you want to reserve a section of preset numbers, for example preset numbers 1 to 8, select preset 10 before starting automatic programming; now only the preset numbers 10 to 40 will be programmed.*

Manual programming

1 Press **TUNER**.
2 Press **TUNER** (BAND) to select the desired waveband : FM, MW or LW.
3 Press **PROGRAM** for less than one second.
→ PROGRAM flag, the frequency and preset number start flashing.
→ The next available preset number will be displayed for selection.
4 Press **TUNING ◀◀** or **▶▶** to tune to the desired frequency.
- If you wish to store the radio station to another preset number, press **PRESET ▼** or **▲** to select the desired preset number.
5 Press **PROGRAM** again.
→ PROGRAM flag will stop flashing, and the radio station will be stored.
- Repeat the above procedure to store other preset radio stations.

Notes:

– *When 40 radio stations are stored and you attempt to store another radio station, the display will show 'PROGRAM FULL'. If you want to change an existing preset number, repeat steps 4 and 5.*
– *You can cancel manual programming by pressing STOP•CLEAR ■ on the system only.*
– *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Tuning to Preset Radio Stations

- Press **PRESET ▼** or **▲** to select the desired preset number.
→ The preset number, frequency and waveband appear on the display.

Receiving RDS radio station

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME:** The station name is displayed.
- **FREQUENCY:** The frequency of the station is displayed.
- **PROGRAM TYPE:** The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT):** text messages appear in the display.

When you have tuned to a RDS station, the RDS logo and the station name will appear on the display.

- The display normally shows the radio station name if available. By repeatedly pressing **RDS** button you can change the type of display information.
→ The display shows in turn:
STATION NAME → FREQUENCY → PROGRAM TYPE → RADIO TEXT → STATION NAME ...

Note:

– *When you press the RDS button and the display shows 'NO RDS', it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.*

RDS Time

Some RDS station may be transmitting a real time clock at an interval of every minute.

Setting the time with RDS clock

1 Press **CLOCK/TIMER**.
→ '-:--' or current time appears on the display.
2 Press **CLOCK/TIMER** once more to enter clock setting mode.
→ '00:00' or current time starts flashing.
3 Press **RDS**.
→ The message 'SEARCH RDS TIME' will be displayed.

→ If the station does not transmit RDS clock, 'NO RDS TIME' will be displayed.
→ When the RDS clock is read, 'RDS TIME' will be displayed. The current clock time is displayed for 2 seconds and will be stored automatically.
→ If within 90 seconds, the RDS time is not detected, 'NO RDS TIME' will be displayed.

News *(only available in Radio Station with RDS)*

You can activate NEWS function in Standby or any source mode except Tuner mode. Once the News PTY (program type) is detected in a RDS station, it will switch to TUNER mode automatically.

To start NEWS function

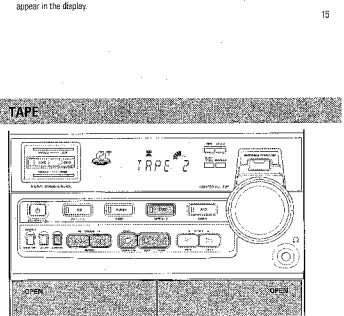
1 Press **NEWS**.
- The NEWS flag and 'NEWS ON' will be displayed.
- It will search for the first available RDS station in the presets and wait for the News PTY (program type) to be available. During News PTY search :
→ If **NEWS** activate from Standby or Demo mode, the display will show 'WAITING FOR NEWS'.
→ If **NEWS** is activated from CD, Tape or Aux mode, the current source activity will be remain uninterrupted.
→ If no RDS station is found after the search, the News function will be switched off. The display will show 'NO RDS NEWS' and NEWS flag will disappear from the display.
- When News transmission is detected, the system will switch to Tuner mode.
→ The NEWS flag starts flashing.
- After News has ended, the last selected source mode will be resumed.
→ The NEWS flag will disappear from the display.

To cancel NEWS function

- Press **NEWS** again.
→ The NEWS flag disappears and 'NEWS OFF' will be displayed.

Notes:

– *During NEWS bulletin, you can press any available source button to cancel NEWS function and execute the relevant source mode.*
– *The NEWS works only once for each activation.*
– *If NEWS is activated from Standby or Demonstration mode, it switches to Tuner mode and the sound will be muted until News is available.*



Loading a tape

- Press **OPEN**.
- The tape deck door opens.
- Load the tape with the open side downward and the full spool to the left.
- Close the tape deck door.

TAPE

Tape Playback

1 Press **TAPE** to select TAPE mode.
→ "TAPE 1" or "TAPE 2" will be displayed.
• Press **TAPE** again to select either tape deck 1 or tape deck 2.
2 Load the tape into the selected tape deck.
3 Press **PLAY** ▶ to start playback.
3a (For Tape Deck 2 only)
Press **A. REPLAY** to select the different type of play mode *(see auto replay)*.
4 Press **STOP** ■ to end playback.

Note:
– *When the tape has stopped playing, the system will switch to the standby mode automatically after 15 minutes if no button is pressed.*

Auto Replay *(only on tape deck 2)*

• Press **A. REPLAY** to select either continuous AUTO REPLAY or ONCE during tape playback.
→ "AUTO REPLAY" or "ONCE" will be displayed.

Notes:
– *This feature is available during tape playback only.*
– *When "AUTO REPLAY" is selected, the tape will rewind automatically at the end of playback for the selected side. Then it will start playing again. It will replay up to a maximum of 20 times or when you press STOP ■.*
– *When "ONCE" is selected, the tape will play the selected side once and then stop.*

Rewind/Fast Forward *(only on tape deck 2)*

At the stop mode
1 You can rewind or fast forward the tape by pressing ◀◀ or ▶▶ respectively.
→ "RW" or "FW" will be displayed depending on which button is pressed.
→ The tape will stop automatically at the end of the rewinding or fast forwarding.
2 Press **STOP** ■ to stop rewind or fast forward.

During playback
• Press and hold ◀◀ or ▶▶ respectively until the desired passage is located.
→ During searching, the sound is reduced to a low volume.
→ When you release ◀◀ or ▶▶, the tape continues playing.

Notes:
– *During rewinding or fast forwarding of a tape, it is possible to select another source (e.g. CD, TUNER or AUX.).*
– *Check and tighten slack tape with a pencil before use. Slack tape may get jammed or may burst in the mechanism.*
– *C-120 tape is extremely thin and is easily deformed or damaged. It is not recommended for use in this system.*
– *Store the tapes at room temperature and do not put them too close to a magnetic field (for example, a transformer, TV or loudspeaker boxes).*

AUX

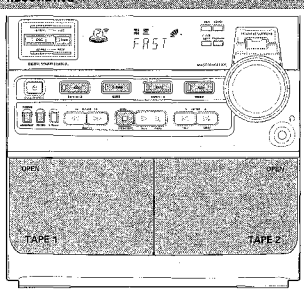
Selecting External Equipment

If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals, you can hear the enhanced sound from the system.

• Press **AUX** to select the external mode.
→ "AUX" will be displayed.

Notes:
– *All the sound control features (e.g. DSC, DBB, etc.) are available for selection.*

RECORDING



Notes:
– *For recording, use only tape of IEC type I (normal tape) or IEC type II (Chrome).*
– *The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for six to seven seconds.*
– *The recording level is set automatically, regardless of the position of VOLUME, DBB or Incredible Surround.*
– *To prevent accidental recording, break out the tab on the left shoulder of the tape side that you want to protect.*
– *If "CHECK TAPE" is displayed, the protection tab has been broken. Put a piece of clear adhesive tape over the opening. Do not cover the Chrome tape detection hole when covering the tab opening.*

One Touch Recording

• For One Touch Recording, as soon as you press **RECORD**, the current source will be recorded on tape deck 2.

1 Load a blank tape in tape deck 2.
2 Press **RECORD** to start recording.
→ REC flag starts flashing.
3 Press **STOP** ■ to stop recording.

Note:
– *When you press RECORD at TAPE mode, "SELECT OTHER SOURCE" will be displayed. One Touch Recording is not possible at TAPE mode.*

Dubbing tapes *(from tape deck 1 to tape deck 2)*

1 Press **TAPE** to select tape deck 2.
2 Load the prerecorded tape into tape deck 1 and a blank tape into tape deck 2.
→ Make sure that the tape in tape deck 1 has its full spool to the left.
3 Press **DUBBING** *once* for normal speed dubbing or *twice within 2 seconds* for high speed dubbing.
→ "NORMAL" (normal speed) or "FAST" (high speed) will be displayed and then followed by "DUBBING".
→ HSD flag appears on the display for high speed dubbing.
• Dubbing will start immediately.
→ REC flag starts flashing.
4 Press **STOP** ■ to stop dubbing.

Notes:
– *At the end of side A, flip the tapes to side B and repeat the procedure.*
– *Dubbing of tapes is only possible from tape deck 1 to tape deck 2.*
– *To ensure good dubbing, use tapes of the same length.*
– *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*
– *You can switch to other source while dubbing.*

RECORDING

CD Synchro Start Recording

1 Load a blank tape into tape deck 2 and a disc into the disc tray.
2 Press **CD** to select CD mode.
→ You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the selected disc.
3 Press **RECORD** to start recording.
→ REC flag starts flashing.
• CD will start playback automatically.
4 Press **STOP** ■ to stop recording.

Recording from other sources

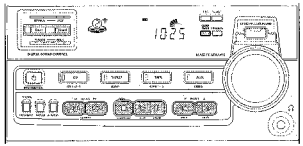
(only on tape deck 2)

1 Load a blank tape into tape deck 2.
2 Press **CD**, **TUNER** or **AUX**.
• Start playback of the selected source.
3 Press **RECORD** ● to start recording.
→ REC flag starts flashing.
4 Press **STOP** ■ to stop recording.

Note:

– *During recording, it is not possible to listen to another sound source.*

CLOCK



View Clock

You can view the clock (if it is set) at standby or any source mode. It will be displayed for about 7 seconds.

• Press **CLOCK/TIMER** briefly.
→ *"10:25"* (the current time) will be displayed.
→ *"- - : - -"* will be displayed if the clock is not set.

Clock Setting

The clock is set in 24-hour mode, e.g. *"00:00"* or *"23:59"*. Before setting the clock, you must be in the View Clock mode.

1 Press **CLOCK/TIMER** to select clock mode.
→ *"00:00"* or the current time starts flashing.
→ ◀◀, ▶▶, |◀, ▶|, ■ light up.
2 Set the hour with ◀◀ or ▶▶.
3 Set the minute with |◀ or ▶|.
4 Press **CLOCK/TIMER** again to store the setting.
→ The clock starts running.

• To exit without storing the setting, press ■.

Notes:

– *During clock setting, if no button is pressed within 90 seconds, the system will exit clock setting mode automatically.*
– *When a power interruption occurs, the clock setting is erased.*
– *To set the time with RDS clock, see "Receiving RDS Radio Station" under TUNER section.*

TIMER

Timer Setting

• The system can switch on to CD, TUNER or TAPE 1 mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
• Before setting the timer, make sure the clock is set correctly.
• The timer will always be switched on once it is set.
• **The volume of the timer will be at the last setting before the set is switched to standby mode.**

1 Press and hold **CLOCK/TIMER** for more than 2 seconds to select timer mode.
→ *"ON :00:00"* or the last set timer starts flashing. The TIMER flag flashes.
→ The last selected source is lighted while other available sources are flashing.
→ "◀◀, ▶▶, |◀, ▶|, ■ " light up.
2 Press **CD**, **TUNER** or **TAPE** to select the desired source.
3 Press ◀◀ or ▶▶ to set the hour for the timer to start.
4 Press |◀ or ▶| to set the minute for the timer to start.

TIMER

5 Press **CLOCK/TIMER** to store the start time.
→ The TIMER is now set.
→ The TIMER flag remains on the display.

• To exit without storing the setting, press ■.

• At the preset time, the TIMER will be activated.
→ The selected source will be played.

Notes:

– *During timer setting, if no button is pressed within 90 seconds, the system will exit timer setting mode automatically.*
– *If the source selected is TUNER, the last tuned frequency will be switched on.*
– *If the source selected is CD, playback will begin with the first track of the last selected disc. If the CD trays are empty, the TUNER will be selected instead.*
– *If the source selected is TAPE 1, and if the preset time is reached during high speed dubbing, the TUNER source will be selected instead.*

To cancel the TIMER

1 Press **CLOCK/TIMER** for more than 2 seconds.
2 Press ■ to cancel the timer.
→ *"CANCEL"* will be displayed.
→ The TIMER flag disappears from the display.

***To start the TIMER again** (for the same time)*

1 Press **CLOCK/TIMER** for more than 2 seconds.
2 Press **CLOCK/TIMER** again to store the start time and the selected source.

MAINTENANCE

Maintenance

Cleaning the Cabinet

• Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs

• When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
• Do not use solvents such as benzine, thinner, commercially available cleaners, or antistatic spray intended for analog records.

Cleaning the CD lens

• After prolonged usage, dirt or dust may accumulate at the CD lens. To ensure good playback quality, clean the CD lens with Philips CD Lens Cleaner or any commercially available. Follow the instructions supplied with the Lens Cleaner.

Cleaning the Heads and the Tape Paths

• To ensure good recording and playback quality, clean the heads, the capstan(s), and pressure roller(s) after every 50 hours of tape operation.
• Use a cotton swab slightly moistened with cleaning fluid or alcohol.
• You can also clean the heads by playing a cleaning tape through once.

Demagnetizing the heads

• Use a demagnetizing tape available at your dealer.

TROUBLESHOOTING

Warning! Under no circumstances you should try to repair the set yourself as this will invalidate the guarantee. Do not open the set as there is a risk of electric shock.

- If a fault occurs, check the points listed below before taking the system for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

CD Player Operation

"NO DISC" is displayed.

- The disc is inserted upside down.
→ *Place CD with printed side up.*
- Moisture condensation at the lens.
→ *Wait until lens has adjusted to normal room temperature.*
- There is no disc in the CD tray.
→ *Insert a CD.*
- The CD is dirty, badly scratched or warped.
→ *Clean or replace the CD.*
- The CD lens is dirty or dusty
→ *See section under Maintenance.*

"DISC NOT FINALIZED" is displayed.

- The CD-RW or CD-R disc is not properly recorded for the use of a standard CD player.
→ *Read the instruction booklet of your CD-Rewritable or CD-Recorder on how to finalize a recording.*
- The CD is badly scratched or dirty.
→ *Replace or clean CD.*

Radio Reception

Poor radio reception

- The signal strength is too weak.
→ *Adjust the antenna.*
- The TV or VCR is too close to the stereo system.
→ *Separate the stereo system from the TV or VCR.*
→ *Connect an external antenna for better reception.*

Tape Deck Operation

"RECORDING ACTIVE" is displayed.

- A recording is in progress.
→ *Stop the recording or wait until it is finished.*

"TAPE DUBBING ONLY" is displayed.

- Tape dubbing is only possible in tape mode.
→ *Switch source to tape mode.*

Recording or playback cannot be made or there is a decrease in audio level.

- *Dirty tape heads, capstans or pressure rollers.*
→ *See section on tape deck maintenance.*
- Magnetic build-up in the record/playback head.
→ *Use demagnetizing tape.*

General

System does not react when any button is pressed.

- Electrostatic discharge.
→ *Press STANDBY-ON to switch the system off. Remove the AC power plug from the wall outlet, then reconnect and switch on the system again.*

No or poor sound.

- Volume is not turned up.
→ *Adjust VOLUME.*
- The system is muted.
→ *Press MUTE in switch on the sound.*
- The headphones are connected.
→ *Disconnect the headphones.*
- Speakers are not connected or are connected wrongly.
→ *Check that the speakers are connected correctly.*
→ *Make sure that the stripped speaker wire is clamped.*

Reversed left and right sound.

- Speakers are connected wrongly.
→ *Check the speaker connections and location.*

Lack of bass sound or apparently imprecise physical location of musical instruments.

- Speakers are connected wrongly.
→ *Check the speaker connection for proper phasing, red/black wires to red/black terminals.*

Remote control has no effect on the system.

- The distance to the system is too large.
→ *Reduce the distance.*
- Batteries are inserted incorrectly.
→ *Insert the batteries with their polarities (+/– signs) as indicated..*
- Batteries are exhausted.
→ *Replace the batteries.*
- Wrong source is selected.
→ *Select the source (CD, TUNER, etc.) before pressing the function button, (PLAY, PREV/NEXT, etc.).*

Timer not working.

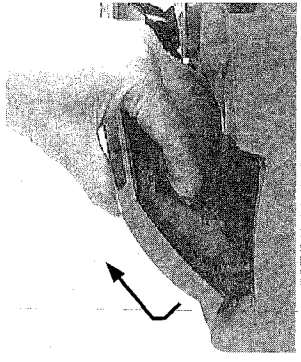
- Timer is not switched on.
→ *Press CLOCK/TIMER to switch on the timer.*
- Dubbing/recording is in progress.
→ *Stop dubbing/recording.*

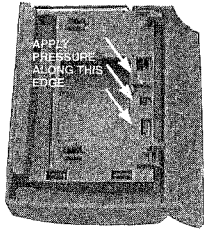
System displays features automatically; buttons flash continuously.

- Demonstration mode is switched on.
→ *Press and hold ■ for 5 seconds to switch off the demonstration.*

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

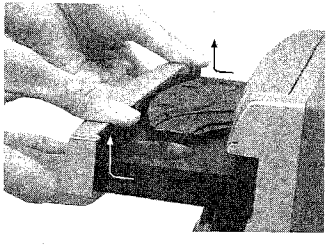


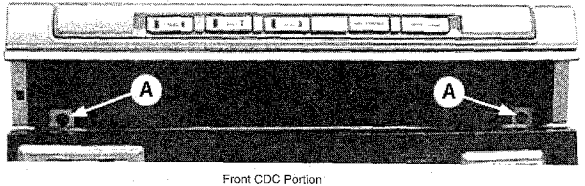


Cassette door

Dismantling of the Front Panel

1) Slide out the tray an remove the CDC front cover as indicated.
2) Loosen the 8 screws to separate the Front Panel from the rear portion.
   - 2 screws A on the front
   - 2 screws each on the left & right side
   - 2 screws at the bottom

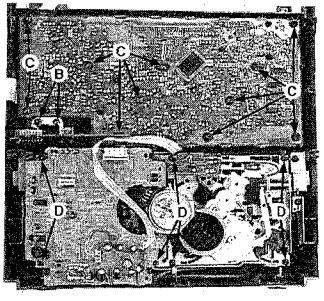




Front CDC Portion

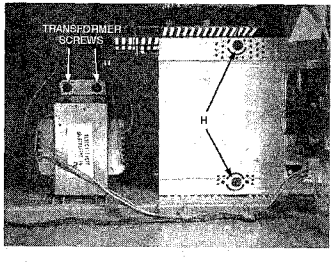
Dismantling of Assemblies on the Front Panel

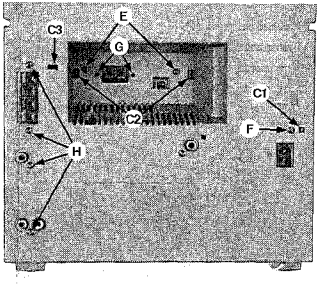
1) Remove 2 screws B to loosen the Karaoke* / Headphone board.
   *Note: Only 1 screw B for non-Karaoke version.
2) Remove 11 screws C as indicated to loosen the Front board.
3) Remove 7 screws D to loosen the ETF Module



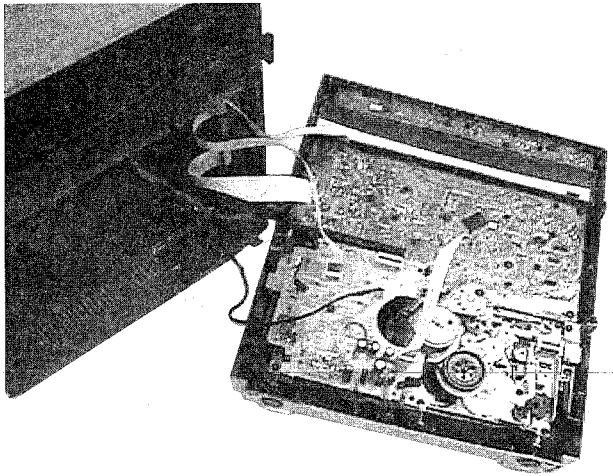
Dismantling of Rear Portion

1) Remove 1 screw F & uncatch C1 to loosen the Mains socket pc board.
2) Remove 2 screws E, 2 screws G* and uncatch C2 to loosen the Tuner pc board assembly.
   *Note: Screws G will be deleted after the holes on the rear cabinet are removed.
3) Remove 6 screws H (4x on the rear and 2x on the heatsink) & uncatch C3 to loosen the Combi board (Main part).

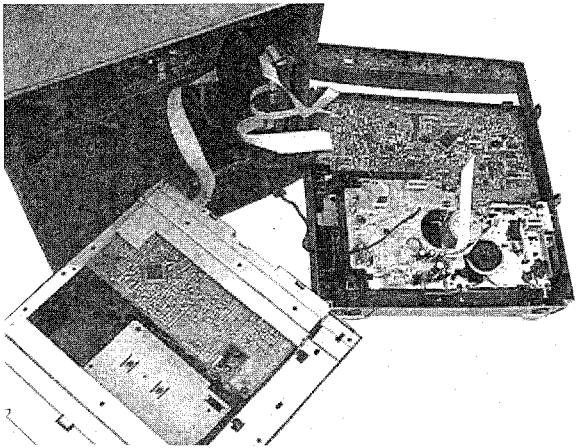




Service pos A

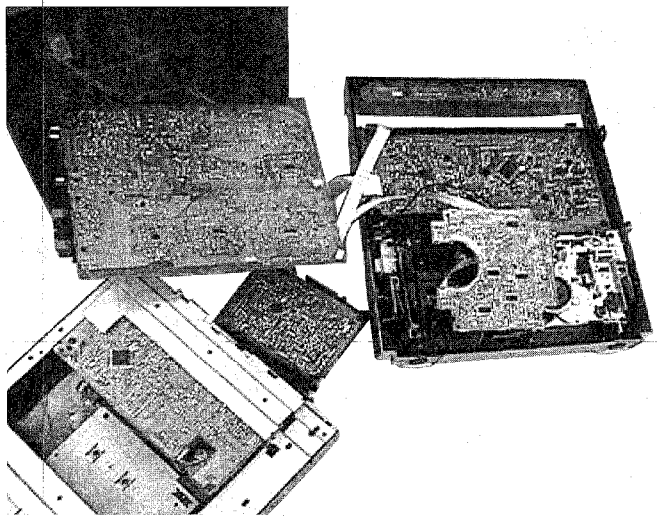


Service pos B



3-2

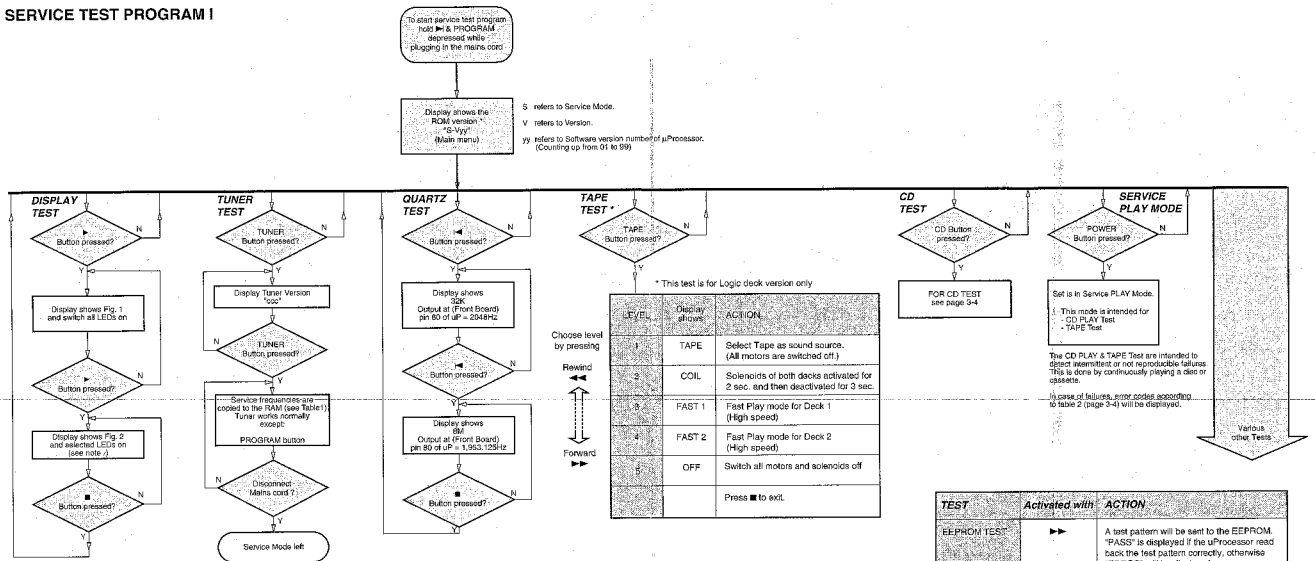
Service pos C



Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex connectors before encasing, otherwise faults may occurs.

3-3

SERVICE TEST PROGRAM I


To start service test program hold ▶▶| & PROGRAM depressed while plugging in the mains cord
Display shows the ROM version " "S-Vyy" (Main menu)
S refers to Service Mode.
V refers to Version.
yy refers to Software version number of µProcessor. (Counting up from 01 to 99)
DISPLAY TEST
Button pressed?
Display shows Fig. 1 and switch all LEDs on
Display shows Fig. 2 and selected LEDs on (see note ♪)
TUNER TEST
TUNER Button pressed?
Display Tuner Version "ccc"
Service frequencies are copied to the RAM (see Table1). Tuner works normally except: PROGRAM button
Disconnect Mains cord ?
Service Mode left
QUARTZ TEST
Display shows 32K Output at (Front Board) pin 80 of uP = 2048Hz
Display shows 6M Output at (Front Board) pin 80 of uP = 1,953.125Hz
TAPE TEST *
TAPE Button pressed?
* This test is for Logic deck version only
Choose level by pressing
Rewind ◀◀
Forward ▶▶
CD TEST
CD Button pressed?
FOR CD TEST see page 3-4
SERVICE PLAY MODE
POWER Button pressed?
Set is in Service PLAY Mode.
- This mode is intended for
- CD PLAY Test
- TAPE Test
The CD PLAY & TAPE Test are intended to detect intermittent or not reproducible failures. This is done by continuously playing a disc or cassette.
In case of failures, error codes according to table 2 (page 3-4) will be displayed.
Various other Tests

LEVEL	Display shows	ACTION
1	TAPE	Select Tape as sound source. (All motors are switched off.)
2	COIL	Solenoids of both decks activated for 2 sec. and then deactivated for 3 sec.
3	FAST 1	Fast Play mode for Deck 1 (High speed)
4	FAST 2	Fast Play mode for Deck 2 (High speed)
5	OFF	Switch all motors and solenoids off
		Press ■ to exit.

PRESET	Europe "EUR"	East Eur. "EAS"	East Eur. Extended-band "EAS"	USA "USA"	Oversea "OSE"
1	87.5MHz	87.5MHz	65.81MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz
3	531kHz	531kHz	74MHz	530kHz	531/530kHz
4	1602kHz	1602kHz	87.5MHz	1700kHz	1602/1700kHz
5	558kHz	558kHz	531kHz	560kHz	558/560kHz
6	1494kHz	1494kHz	1602kHz	1500kHz	1494/1500kHz
7	153kHz	87.5MHz	558kHz	98MHz	87.5MHz
8	279kHz	87.5MHz	1494kHz	87.5MHz	87.5MHz
9	198kHz	87.5MHz	98MHz	87.5MHz	87.5MHz
10	98MHz	87.5MHz	70.01MHz	87.5MHz	87.5MHz
11	87.5MHz	98MHz	65.81MHz	87.5MHz	98MHz

Table 1

East Europe TUNER IF offset correction

1) Input a reference frequency 87.5MHz from the generator.

2) Proceed to the Tuner Test Mode

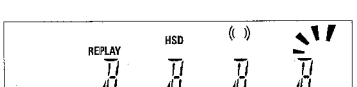
3) Hold TUNER button down for > 3 seconds

4) The set will self-calibrate automatically and display "OFS-xx" when calibration is successful, otherwise it will display "00E".

xx : offset value between -3 to +3

Note: This has to be done whenever the Eeprom, Microprocessor or the components in the oscillator circuitry are replaced.

Figure 1



note ♪ : CDC1, CDC3, CD, Tape, Aux, ◀◀, ■ and |◀.

Figure 2

TEST	Activated with	ACTION
EEPROM TEST	▶▶ ■ to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "ERROR" will be displayed.
EEPROM FORMAT	◀◀	Load default data. Display shows "NEW" for 1 second. ***Caution! All presets from the customer will be lost!!***
KEY TEST	▶| ■ to Exit	Key numbers according table 3 are shown on the display. (see Chapter 3-4)
FAST CLOCK TEST	CLOCK/TIMER	The clock is switched to fast mode. "FAST" is displayed for 1 sec. Press CLOCK/TIMER again to reset the clock to normal. "NORMAL" displayed for 1 sec.
VOLUME TEST	Volume Knob	Display shows volume value for 2 seconds. Volume increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

Error code	Type	Error Description
E1000	W	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	W	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	W	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed. Inner-switch or sledge motor problem.
E1003	W	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	W	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	W	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1007	W	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	W	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Discmotor problem.
E1020	F	Focus Search Error The focus point has not been found within a certain time.
E1070	W	The carousel switch is not open within certain time. This can happen when either the switch is defective and closed all the time, or when the carousel is blocked when located exactly at a disc position.
E1071	W	The carousel-position-switch-did-not-close-within-a-certain-time. This can happen when the switch is defective and never closes electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 6 Sec.
E1079	W	The drawer could not enter the inside position is opening again. This can be caused because the drawer is blocked by something and cannot go fully inside, or the drawer switch is defective and does not close.
E2020*	F	Head Movement Error Deck 1 Generated if the head does not reach the desired position within a certain time.
E2021*	F	Head Movement Error Deck 2 Generated if the head does not reach the desired position within a certain time.

F = Fatal error & the set stop play function W = Warning
* For Logic set only.

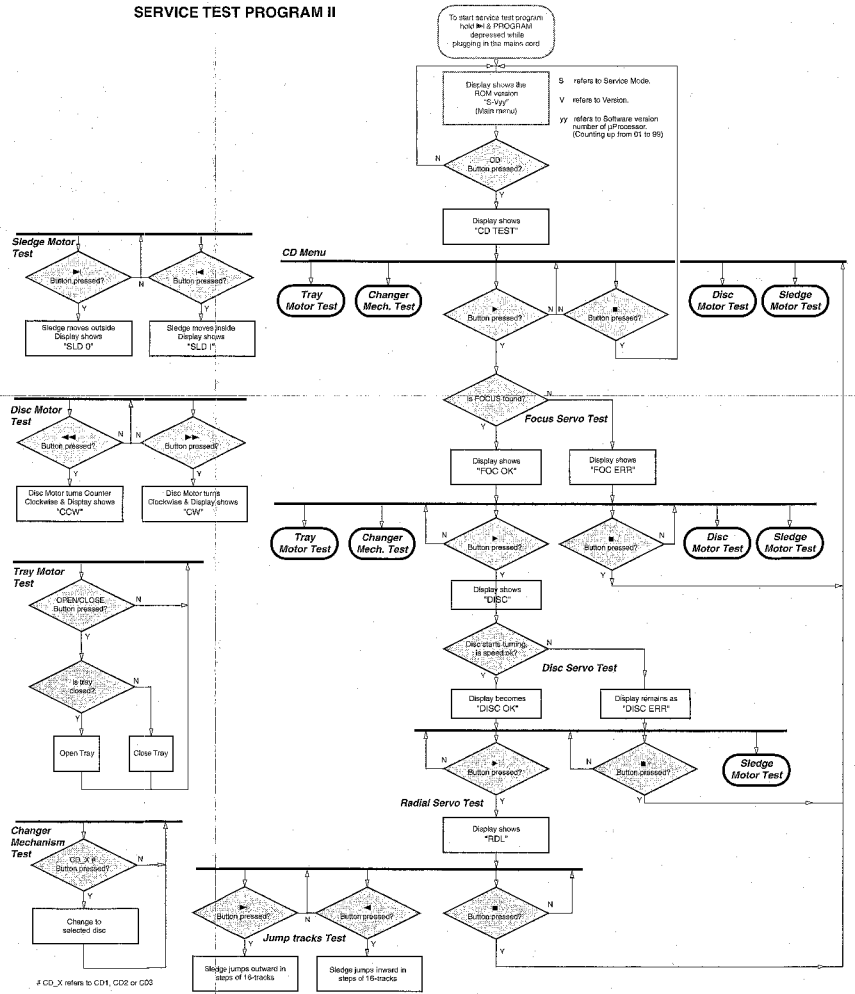
Table 2

Keys activated	Display shows	Keys activated	Display shows	Keys activated	Display shows
No Key pressed	--	CLOCK /TIMER	10	RECORD *	21
Any Remote control key	RC	PROGRAM	11	REPLAY *	22
CD1 *	1	INCR. SURROUND *	12	◄◄	23
CD2 *	2	VOLUME UP *	13	►►	24
CD3 *	3	VOLUME DOWN *	14	■	Exit
DISC CHANGE	4	STANDBY - ON	15	►II	26
OPEN / CLOSE	5	CD	16	I◄	27
DSC	6	TUNER	17	►I	28
DBB	7	TAPE	18		
RDS *	8	AUX	19		
NEWS *	9	DUBBING	20		

* Not for all type/version

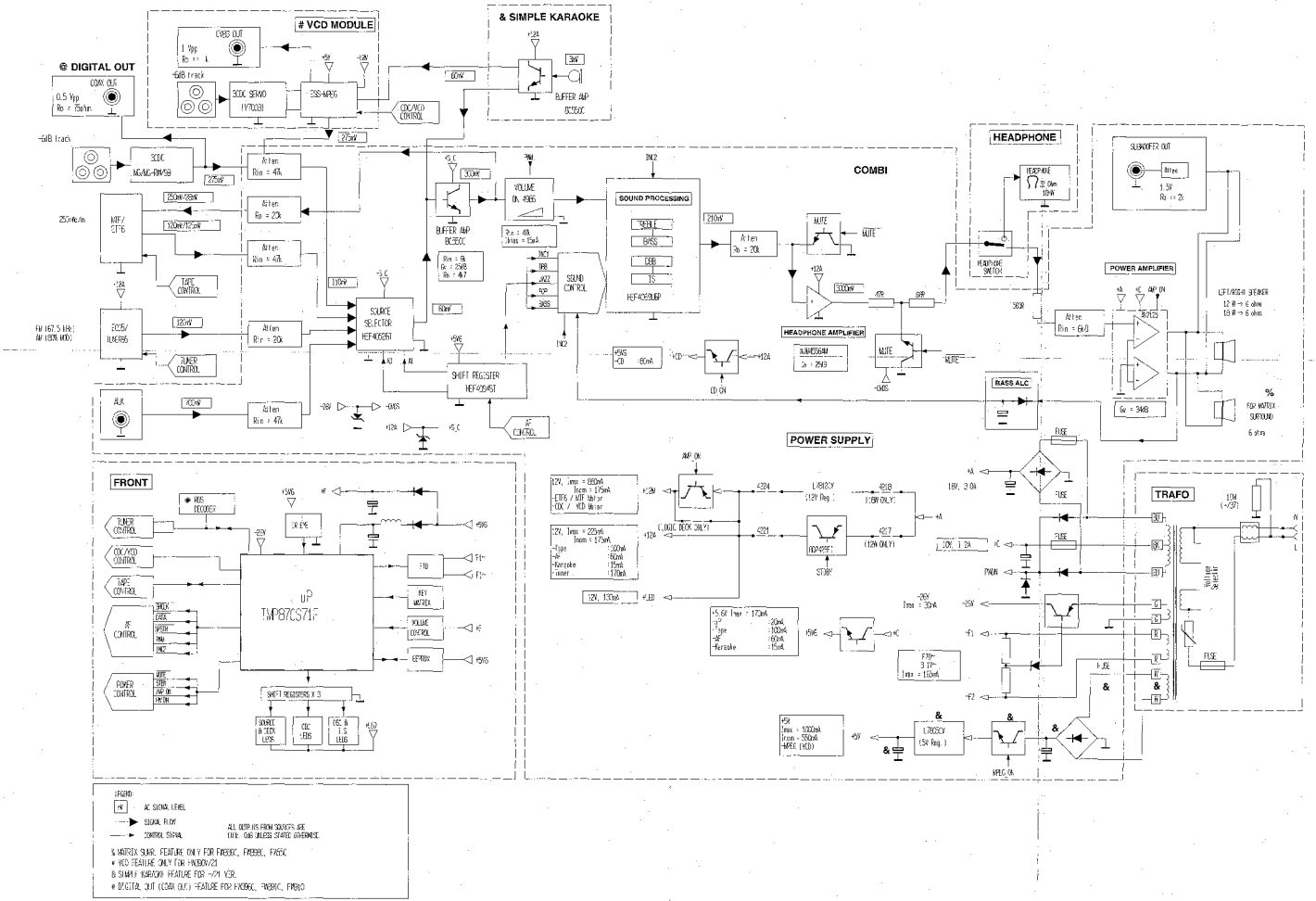
Table 3

SERVICE TEST PROGRAM II


To start service test program hold ►I & PROGRAM depressed while plugging in the mains cord
Display shows the ROM version "S-Vyy" (Main menu)
S refers to Service Mode.
V refers to Version.
yy refers to Software version number of uProcessor. (Counting up from 01 to 99)
CD Button pressed?
Display shows "CD TEST"
Sledge Motor Test
Button pressed?
Sledge moves outside Display shows "SLD 0"
Sledge moves inside Display shows "SLD 1"
CD Menu
Tray Motor Test
Changer Mech. Test
Disc Motor Test
Sledge Motor Test
Is FOCUS found?
Focus Servo Test
Display shows "FOC OK"
Display shows "FOC ERR"
Disc Motor Test
Disc starts turning, is speed ok?
Disc Servo Test
Display shows "DISC"
Display becomes "DISC OK"
Display remains as "DISC ERR"
Radial Servo Test
Display shows "RDL"
Jump tracks Test
Sledge jumps outward in steps of 16-tracks
Sledge jumps inward in steps of 16-tracks
Tray Motor Test
OPEN/CLOSE Button pressed?
Is tray closed?
Open Tray
Close Tray
Changer Mechanism Test
CD_X # Button pressed?
Change to selected disc
CD_X refers to CD1, CD2 or CD3

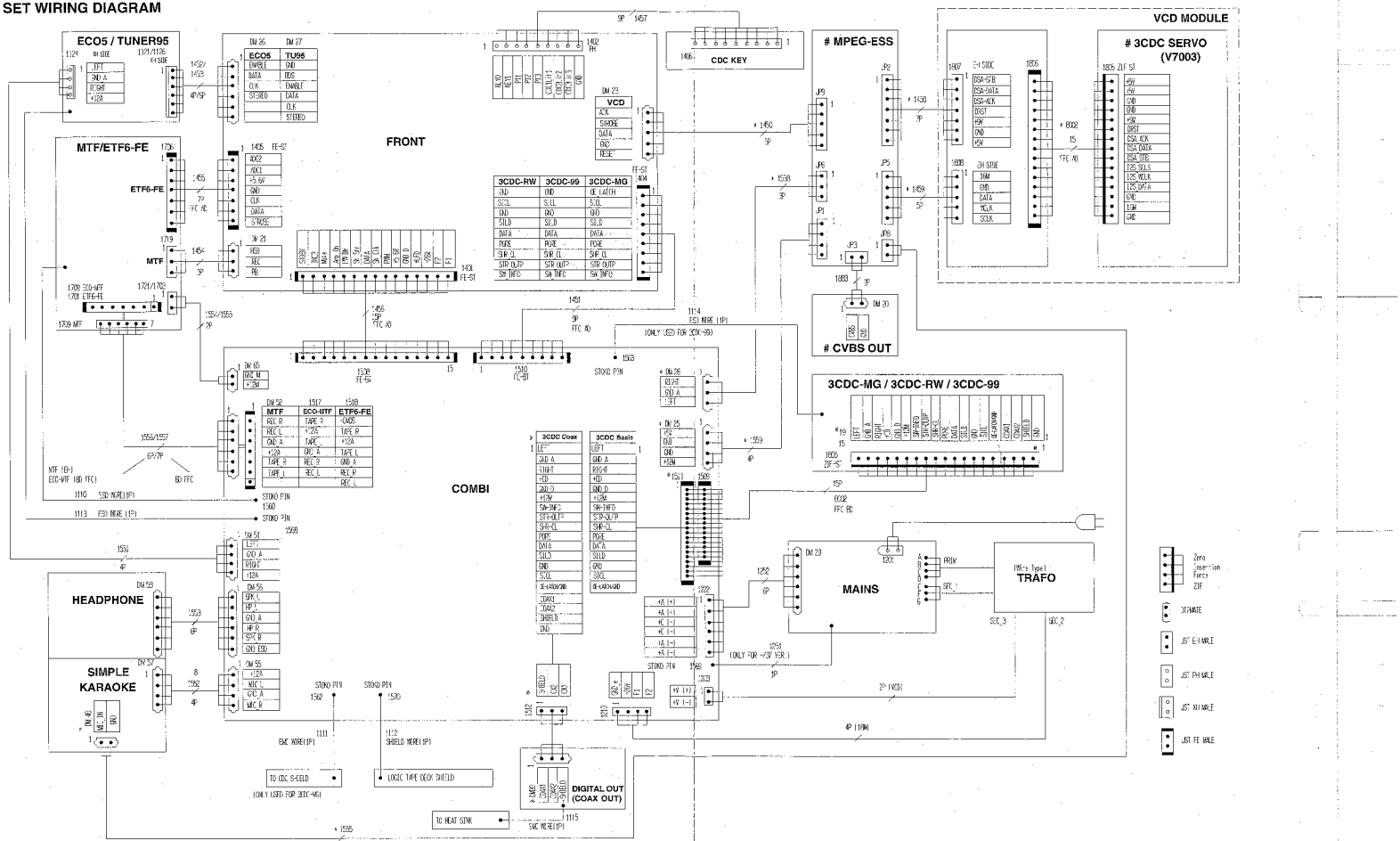
4-1

SET BLOCK DIAGRAM



5-1

SET WIRING DIAGRAM



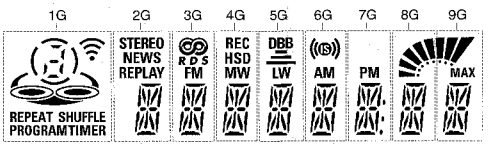
FRONT BOARD

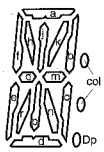
TABLE OF CONTENTS

LCD pin connection & Variation table 6-1
Main part - Component & Chip layout 6-2
Optical part - Circuit & Layouts 6-2
Main part - Circuit diagram 6-3
Electrical parts list 6-4

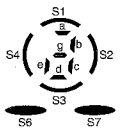
6-1

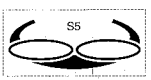
LCD DISPLAY PIN CONNECTIONS



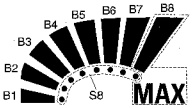


(2G~9G)





(1G)



(8G , 9G)

	1G	2G	3G	4G	5G	6G	7G	8G	9G
P1	S1	a	a	a	a	a	a	a	a
P2	S2	h	h	h	h	h	h	h	h
P3	S3	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b	b
P6	c	f	f	f	f	f	f	f	f
P7	a , d , g	m	m	m	m	m	m	m	m
P8	e	g	g	g	g	g	g	g	g
P9	S5	c	c	c	c	c	c	c	c
P10	S6	e	e	e	e	e	e	e	e
P11	S7	r	r	r	r	r	r	r	r
P12	SHUFFLE	n	n	n	n	n	n	n	n
P13	REPEAT	d	d	d	d	d	d	d	d
P14	TIMER	STEREO	RDS	REC	DBB		PM	S8	
P15	PROGRAM	REPLAY	FM	HSD			col	B5	
P16		NEWS	-	MW	LW	AM	Dp	B6	
P17	-	-	-	-	-	-	-	B1	-
P18	-	-	-	-	-	-	-	B2	-
P19	-	-	-	-	-	-	-	B3	-
P20	-	-	-	-	-	-	-	B4	-
P21	-	-	-	-	-	-	-	-	B7
P22	-	-	-	-	-	-	-	-	B8

Front Boa

A51200
A51220
A51240
A51350
A51360

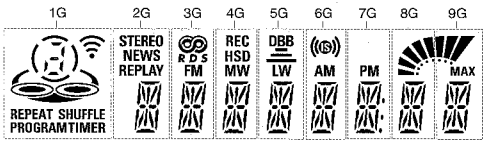
Variations

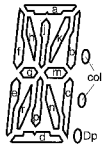
ITEM NO.
DM21
DM23
DM26
DM27
DM30
1326
1404
1405
1408
1409
1418
1419
1423
1424
1425
2417
2421
2431
2432
2433
3407
3478
3479
3509
3539
3541
3546
3575
3576
3577
3578
3584
3585
3586
3587
4400
4403
4501
4540
4600
4602
4603
5403
6402
6419
6421
6424
6427
9491

FEATURE:
RDS
CTRL LIT.
Rotary Enc
Digital Out

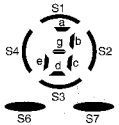
x = Item in

LCD DISPLAY PIN CONNECTIONS

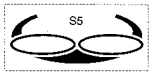


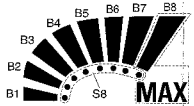


(2G~9G)



(1G)





(8G , 9G)

	1G	2G	3G	4G	5G	6G	7G	8G	9G
P1	S1	a	a	a	a	a	a	a	a
P2	S2	h	h	h	h	h	h	h	h
P3	S3	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b	b
P6	c	f	f	f	f	f	f	f	f
P7	a , d , g	m	m	m	m	m	m	m	m
P8	e	g	g	g	g	g	g	g	g
P9	S5	c	c	c	c	c	c	c	c
P10	S6	e	e	e	e	e	e	e	e
P11	S7	r	r	r	r	r	r	r	r
P12	SHUFFLE	n	n	n	n	n	n	n	n
P13	REPEAT	d	d	d	d	d	d	d	d
P14	TIMER	STEREO	RDS	REC	DBB		PM	S8	
P15	PROGRAM	REPLAY	FM	HSD			col	B5	
P16		NEWS	-	MW	LW	AM	Dp	B6	
P17	-	-	-	-	-	-	-	B1	-
P18	-	-	-	-	-	-	-	B2	-
P19	-	-	-	-	-	-	-	B3	-
P20	-	-	-	-	-	-	-	B4	-
P21	-	-	-	-	-	-	-	-	B7
P22	-	-	-	-	-	-	-	-	B8

Front Board application

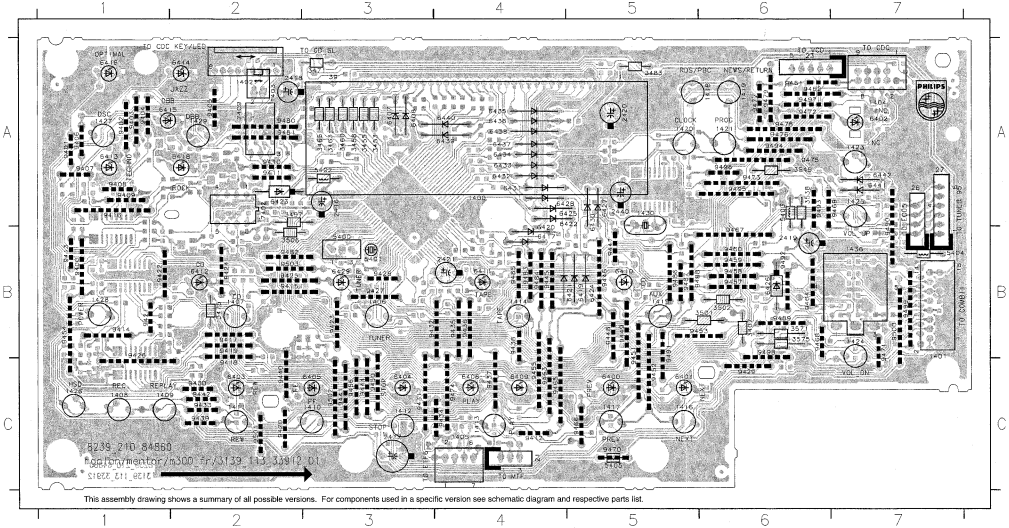
A51200	FW45C/37, FW320C/21/21M/22/37
A51220	FW55C/37
A51240	FW350C/22/34
A51350	FW380C/21/21M
A51360	FW390C/37, FW398C/30
A51370	FW390C/21/21M, FW398C/21/21M
A51380	FW390C/22/34, FW398C/34
A51390	FW390V/21/21M
A51400	FW65C/37, FW380C/30/37, FW388C/37
A52550	FW391C/22, FW396C/22, FW910R/22

Variations table for Front Board

ITEM NO.	A51200	A51220	A51240	A51350	A51360	A51370	A51380	A51390	A51400	A52550
DM21	x	x	-	x	-	-	-	-	x	-
DM23	-	-	-	-	-	-	-	x	-	-
DM26	x	x	-	x	x	x	-	x	x	-
DM27	-	-	x	-	x	x	x	x	-	x
DM30	-	-	-	-	-	-	-	-	-	x
1326	-	-	-	-	-	-	-	-	-	x
1404	x	x	x	x	x	x	x	-	-	x
1405	-	-	x	-	x	x	x	x	-	x
1408	-	-	x	-	x	x	x	x	-	x
1409	-	-	x	-	x	x	x	x	-	x
1418	-	-	x	-	-	-	x	x	-	x
1419	-	-	x	-	-	-	x	x	-	x
1423	-	-	-	-	x	x	x	x	-	x
1424	x	-	-	-	-	-	-	-	-	-
1425	x	-	-	-	-	-	-	-	-	-
2417	-	220µF	220µF	220µF	220µF	220µF	220µF	220µF	220µF	220µF
2421	2,2µF	22µF	22µF	22µF	22µF	22µF	22µF	22µF	22µF	22µF
2431	-	100nF	100nF	100nF	100nF	100nF	100nF	100nF	100nF	100nF
2432	-	-	100pF	-	-	-	100pF	-	-	100pF
2433	-	-	47pF	-	-	-	47pF	-	-	47pF
3407	-	-	-	-	1k	1k	1k	1k	-	1k
3478	1k	1k	1k	1k	1k	1k	1k	-	1k	1k
3479	100R	100R	100R	100R	100R	100R	100R	-	100R	100R
3509	1k	1k	1k	1k	1k	1k	1k	-	1k	1k
3539	10k	10k	-	10k	10k	10k	-	10k	10k	-
3541	-	-	1k	-	-	-	1k	-	-	1k
3546	10k	10k	-	10k	10k	10k	-	10k	10k	-
3575	6k8	10k	10k	10k	10k	10k	10k	10k	10k	10k
3576	47k	10k	10k	10k	10k	10k	10k	10k	10k	10k
3577	-	-	-	-	12k	12k	12k	12k	12k	12k
3578	-	-	-	-	5k6	5k6	5k6	5k6	5k6	5k6
3584	-	-	-	-	-	-	-	47k	-	-
3585	-	-	-	-	-	-	-	47k	-	-
3586	-	-	47k	-	47k	-	47k	47k	-	47k
3587	-	-	-	-	-	-	-	47k	-	-
4400	x	x	-	x	-	-	-	-	x	-
4403	x	-	-	-	-	-	-	-	-	-
4501	x	x	x	-	-	-	-	-	-	-
4540	-	x	x	x	x	x	x	x	x	x
4600	-	-	-	-	-	-	-	x	-	-
4602	x	-	-	-	-	-	-	-	-	-
4603	-	x	x	x	x	x	x	x	x	x
5403	-	-	2,2µH	-	-	-	2,2µH	-	-	2,2µH
6402	-	-	-	-	x	x	x	x	-	x
6419	x	x	x	x	-	-	-	-	-	-
6421	x	-	-	-	-	-	-	-	-	-
6424	-	-	-	x	-	x	-	x	-	-
6427	x	x	x	-	-	-	-	-	-	-
9491	-	x	x	-	-	-	-	-	-	-
FEATURE:										
RDS	-	-	x	-	-	-	x	-	-	x
CTRL LIT.	-	-	-	x	x	x	x	x	x	x
Rotary Encoder	-	x	x	x	x	x	x	x	x	x
Digital Out	-	-	-	-	-	-	-	-	-	x

x = Item in use.

COMPONENT LAYOUT


1 2 3 4 5 6 7
A
B
C
TO CDC KEYLED
TO CDC SL
TO CDC
OPTIMAL
SAVE
DSC
DBB
DNM
DNR
DVC
DVM
DVS
DYN
DYNAMIC BASS
DYNAMIC TREBLE
VOLUME
BALANCE
SOURCE
SOURCE SELECT
MONO
STEREO
SPATIAL
SPATIAL EFFECT
SPATIAL DEPTH
SPATIAL WIDTH
CENTRE
CENTRE LEVEL
SUBWOOFER
SUBWOOFER LEVEL
TUNER
TUNER PRESET
TUNER BAND
TUNER MODE
TUNER MEMORY
TUNER SCAN
TUNER STORE
TUNER TUNING
TUNER TUNING UP
TUNER TUNING DOWN
TUNER PRESET UP
TUNER PRESET DOWN
TUNER BAND UP
TUNER BAND DOWN
TUNER MODE UP
TUNER MODE DOWN
TUNER MEMORY UP
TUNER MEMORY DOWN
TUNER SCAN UP
TUNER SCAN DOWN
TUNER STORE UP
TUNER STORE DOWN

6-2

CHIP LAYOUT

2408 B5 2432 B1 2452 A2 3409 B7 3426 A4 3443 A4 3469 A5 3493 A3 3513 B4 3535 A1 3556 B5 3574 C7 4403 A1 4422 B7 4438 B7 4504 C3 4520 B1 4537 B2 7410 A6
2409 B5 2433 B1 2453 A2 3410 A6 3427 A4 3444 A4 3472 A5 3494 A6 3515 B5 3536 A1 3557 B7 3576 B2 4407 A7 4423 B1 4439 B6 4505 B1 4521 B1 4538 C5 7411 A6
2410 A3 2434 B1 2454 A2 3411 B7 3428 A4 3445 A4 3474 B5 3495 A6 3516 A5 3537 A1 3558 B7 3577 B7 4408 C3 4424 C4 4440 B6 4506 B2 4522 D6 4539 C5 7412 A6
2411 A3 2435 B1 2455 A1 3412 B6 3429 A4 3446 A4 3476 A5 3496 A6 3518 A5 3539 A3 3559 B1 3578 B6 4409 A6 4425 A2 4441 C6 4507 B2 4524 C5 4540 C5 7413 B6
2412 C7 2436 B1 2456 C7 3413 C5 3430 A4 3447 B4 3477 B4 3498 B2 3519 A3 3541 B1 3561 A6 3579 B6 4410 A6 4426 B7 4442 A6 4508 A2 4525 A7 4550 B4
2414 A6 2437 A1 2457 B1 3414 B6 3431 B4 3448 A7 3478 A5 3499 B6 3520 B2 3543 B1 3562 A6 3580 B6 4411 A6 4427 B3 4443 B4 4509 A1 4526 B5 4551 B4
2415 B4 2438 A3 2458 B7 3415 B6 3433 B6 3449 A7 3479 B3 3500 B6 3521 B5 3544 A3 3563 A6 3581 B6 4412 A7 4428 B7 4444 A3 4510 B2 4527 B5 4600 A5
2422 B5 2441 B1 2459 A1 3416 B6 3434 A5 3451 A7 3480 B3 3503 A6 3522 A3 3545 A1 3564 A6 3582 B4 4413 B5 4429 A3 4445 B5 4511 B2 4528 B4 4601 A7
2423 B5 2442 B1 2460 C3 3417 B3 3435 A5 3452 A7 3481 A6 3504 B5 3523 A3 3546 A3 3565 A7 3583 B4 4414 A7 4430 B7 4446 C6 4512 C2 4529 B4 4602 B5
2424 B5 2443 B5 3400 B3 3419 B4 3436 A5 3454 B4 3482 B4 3505 A3 3524 C4 3547 A1 3566 A6 3584 A5 4415 B7 4431 B4 4447 A2 4513 A5 4530 B4 4603 C5
2425 B6 2444 B7 3401 B3 3420 A5 3437 A4 3456 B4 3484 A6 3507 B3 3525 C4 3548 A1 3567 B7 3585 B5 4416 B7 4432 B7 4448 B3 4514 C2 4531 B4 7400 A3
2426 B6 2445 A3 3402 A3 3421 A4 3438 A4 3459 B7 3485 B6 3508 B2 3527 C5 3551 A7 3568 B6 3586 B3 4417 B6 4433 B7 4449 B3 4515 C4 4532 B3 7401 A5
2427 A6 2446 A3 3403 B6 3422 A4 3439 A4 3459 B4 3486 A6 3509 B2 3528 C5 3552 B7 3569 B7 3587 B4 4418 C6 4434 B7 4500 B6 4516 C6 4533 B3 7404 B7
2428 B6 2448 A2 3405 B6 3423 A4 3440 A4 3462 B4 3488 A5 3510 B5 3529 A5 3553 B1 3570 B7 4400 A1 4419 A6 4435 C4 4501 A7 4517 C6 4534 C6 7405 A7
2430 A5 2450 A7 3406 A7 3424 A4 3441 A4 3464 B4 3489 A5 3511 B3 3530 A5 3554 A7 3572 B2 4401 A6 4420 B1 4436 C6 4502 B5 4518 B3 4535 A3 7406 B7
2431 A1 2451 B7 3408 B7 3425 A4 3442 A4 3467 B3 3490 B5 3512 B3 3534 A1 3555 B5 3573 B7 4402 B6 4421 B1 4437 B2 4503 B5 4519 B3 4536 A3 7408 B5

3433 C2 9446 B5 9458 B6 9470 C5 9482 B2 9494 A6
3434 C3 9447 B5 9459 B6 9471 B7 9483 B4 9495 A6
3435 B4 9448 B5 9460 B6 9472 A6 9484 B4 9496 A6
3436 B4 9449 B5 9461 A6 9473 A6 9485 B4 9497 A6
3437 C4 9450 C3 9462 A6 9474 C4 9486 B5 9498 B6
3438 B4 9451 B5 9463 C4 9475 A6 9487 B5 9499 B7
3439 C2 9452 C5 9464 B6 9476 A6 9488 B5 9500 B7
3440 C3 9453 B5 9465 C4 9477 A6 9489 B6 9501 C2
3441 C3 9454 B1 9466 C5 9478 A6 9490 B7 9502 C3
3442 C3 9455 C4 9467 B6 9479 A6 9491 B5 9503 B2
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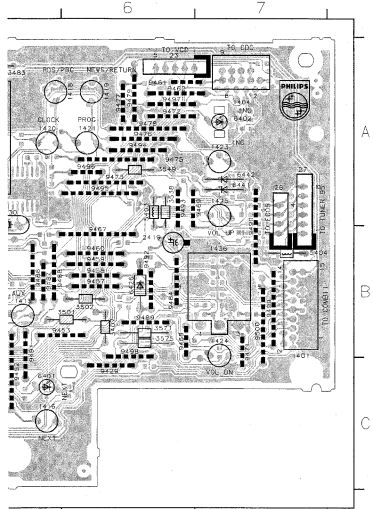
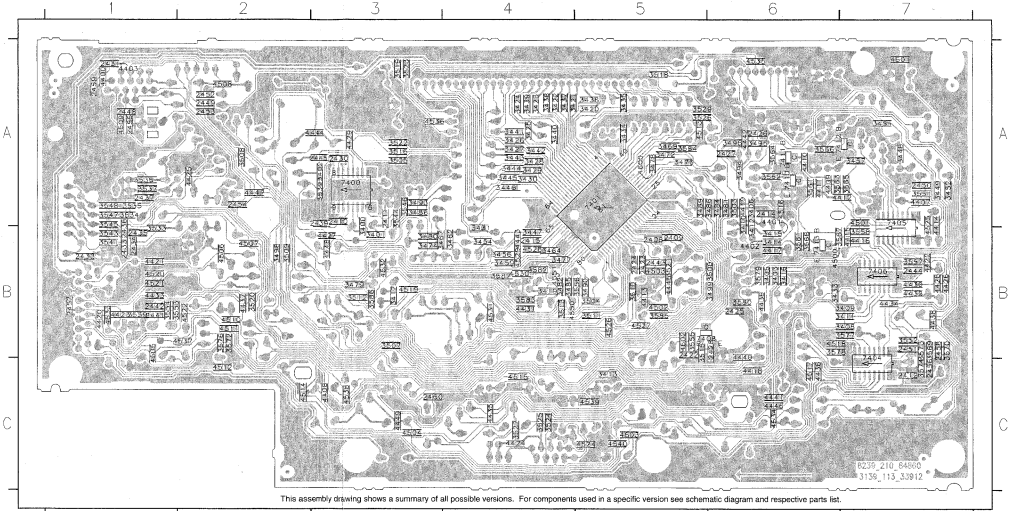
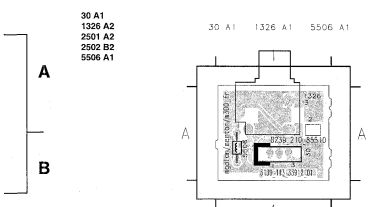
3445 B4 9457 B6 9469 A7 9481 A2 9493 A6



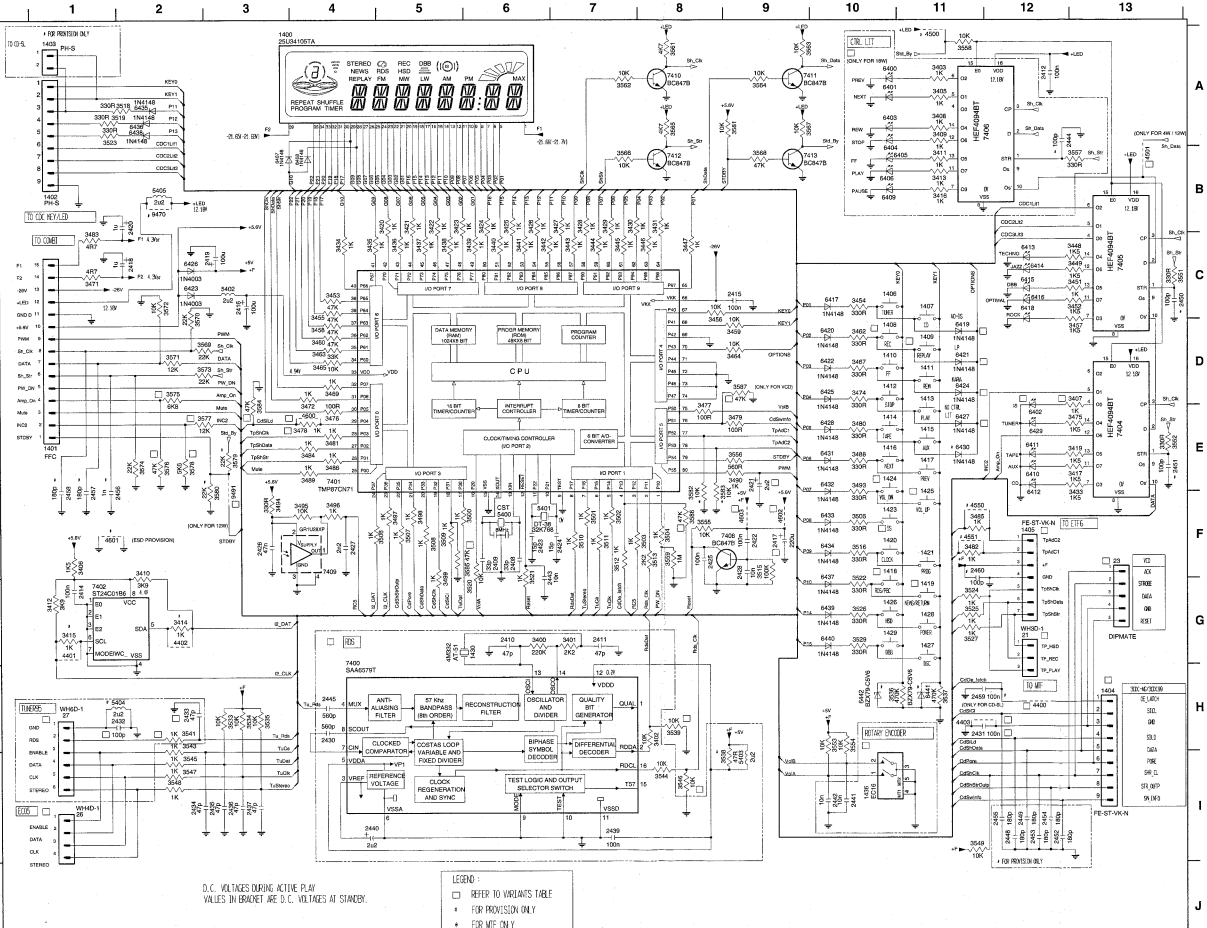


This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.



6-3

CIRCUIT DIAGRAM



21 G12 3424 B6 3547 I2 7406 A11
23 F13 3425 B6 3548 I2 7408 F9
26 I1 3426 B6 3549 I11 7409 F4
27 H1 3427 B7 3551 C13 7410 A8
1400 A3 3428 B7 3552 E13 7411 A8
1401 E1 3429 B7 3553 H10 7412 B8
1402 B1 3430 B7 3554 H10 7413 B9
1403 A1 3431 B8 3555 F8 8470 B2
1404 H13 3433 F13 3556 E9 8491 F3
1405 F12 3434 C4 3557 B13
1406 C10 3435 C4 3558 A11
1407 C11 3436 C5 3559 F8
1408 D10 3437 C5 3561 A8
1409 D11 3438 C5 3562 A7
1410 D10 3439 C6 3563 A9
1411 D10 3440 C6 3564 A9
1412 D10 3441 C6 3565 A8
1413 D11 3442 C6 3566 B7
1414 E10 3443 C6 3567 A9
1415 E11 3444 C7 3568 B9
1416 E10 3445 C7 3569 D2
1417 E11 3446 C8 3570 D2
1418 F10 3447 C8 3571 D2
1419 G11 3448 C13 3572 C2
1420 F10 3449 C13 3573 D2
1421 F11 3451 C13 3574 E2
1423 F10 3452 C13 3576 D2
1424 E10 3453 C4 3576 E2
1425 F11 3454 C13 3577 E2
1426 G10 3455 D4 3578 E2
1427 G11 3456 C8 3579 E3
1428 G11 3457 D13 3580 F3
1429 G12 3458 D4 3581 A9
1430 G6 3459 D9 3582 F8
1436 I10 3460 D4 3583 F9
2409 F6 3462 D4 3585 F6
2409 F6 3463 D4 3585 F6
2410 G6 3464 D4 3586 F8
2411 G7 3465 D4 3587 D9
2412 A12 3467 D10 4400 H12
2414 G9 3468 D4 4401 G1
2415 C9 3471 C1 4402 G2
2416 C3 3472 D4 4403 H11
2417 F9 3474 D10 4500 A11
2418 C2 3475 E13 4501 B13
2419 C3 3476 E4 4550 F11
2420 B2 3477 E8 4551 F11
2421 E9 3478 E4 4600 E4
2422 F9 3479 E9 4601 F1
2423 F6 3480 E10 4602 F9
2424 F7 3481 E4 4603 F9
2425 F8 3482 F11 5400 F6
2426 F8 3483 E4 5401 F6
2427 F4 3484 E4 5402 C3
2428 F8 3485 F11 5403 I9
2430 H4 3486 E4 5404 H1
2431 H11 3488 E10 5405 B2
2432 H1 3489 E4 6400 A10
2433 H2 3490 E9 6401 A10
2434 I2 3493 E10 6402 E12
2435 I2 3495 F4 6403 A10
2436 I3 3496 F4 6404 B10
2437 I7 3496 F6 6405 B11
2439 I7 3497 F5 6406 B10
2440 I3 3498 F5 6407 C10
2441 I10 3498 G6 6408 B4
2442 I10 3500 F6 6409 B10
2443 G6 3501 F7 6410 E12
2444 A12 3502 F7 6411 E12
2445 H4 3503 F8 6412 D10
2448 I12 3504 F8 6413 C12
2449 I12 3505 F10 6414 C12
2450 I13 3506 F5 6415 C12
2451 E13 3507 F5 6416 C12
2452 I12 3508 F5 6417 C10
2453 I12 3509 F5 6418 C12
2454 I12 3510 F7 6419 D11
2455 I12 3511 F7 6420 D10
2456 F1 3512 F7 6421 D11
2457 I11 3513 F8 6422 D10
2458 F1 3516 F9 6423 C2
2459 H11 3516 F10 6424 D11
2460 F11 3518 A2 6425 D10
3400 G6 3519 A2 6426 C2
3401 G7 3520 G6 6427 E11
3402 H8 3521 F6 6428 E10
3403 A11 3522 G10 6429 E12
3404 A11 3523 A1 6430 E11
3406 F1 3524 G11 6431 E10
3407 A11 3525 G11 6432 E10
3408 A11 3526 G10 6433 F10
3409 A11 3527 G11 6434 F10
3410 F2 3528 G10 6435 A2
3411 B11 3533 H3 6436 A2
3412 I9 3534 I3 6437 G10
3413 B11 3536 H3 6438 A2
3414 G2 3536 H10 6439 G10
3415 G1 3537 H11 6440 G10
3416 B11 3538 I9 6441 H11
3417 E13 3539 H6 6442 H10
3419 E13 3541 H2 7400 H6
3420 B5 3543 H2 7401 E4
3421 B5 3544 I9 7402 G1
3422 B5 3545 I2 7404 E13
3423 B5 3546 I8 7405 C13

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1326	4822 267 31729	Digital Out Socket
1400	4822 135 00171	FTD Display
1401	4822 265 10979	Flex Socket 15pin Hort.
1404	4822 265 11531	Flex Socket 9pin Hort.
1405	4822 267 10956	Flex Socket 7pin Hort.
1406	4822 276 13775	Tact Switch
1407	4822 276 13775	Tact Switch
1408	4822 276 13775	Tact Switch
1409	4822 276 13775	Tact Switch
1410	4822 276 13775	Tact Switch
1411	4822 276 13775	Tact Switch
1412	4822 276 13775	Tact Switch
1413	4822 276 13775	Tact Switch
1414	4822 276 13775	Tact Switch
1415	4822 276 13775	Tact Switch
1416	4822 276 13775	Tact Switch
1417	4822 276 13775	Tact Switch
1418	4822 276 13775	Tact Switch
1419	4822 276 13775	Tact Switch
1420	4822 276 13775	Tact Switch
1421	4822 276 13775	Tact Switch
1423	4822 276 13775	Tact Switch
1426	4822 276 13775	Tact Switch
1427	4822 276 13775	Tact Switch
1428	4822 276 13775	Tact Switch
1429	4822 276 13775	Tact Switch
1430	4822 242 72195	Quartz 4,332MHz
1436	4822 273 10365	Rotary Encoder 24P

CAPACITORS

2408	5322 122 32659	33pF 5% 50V
2409	5322 122 32659	33pF 5% 50V
2410	4822 126 13692	47pF 1% 63V
2411	4822 126 13692	47pF 1% 63V
2412	4822 126 14118	100nF +80/-20% 50V
2414	4822 126 14118	100nF +80/-20% 50V
2415	4822 126 14118	100nF +80/-20% 50V
2416	4822 124 23432	100µF 20% 10V
2417	4822 124 12245	220µF 20% 10V
2418	4822 124 40242	1µF 20% 63V
2419	4822 124 41584	100µF 20% 10V
2420	4822 124 22651	1µF 20% 50V
2421	4822 124 41796	22µF 20% 16V
2422	4822 126 14118	100nF +80/-20% 50V
2423	4822 126 13486	15pF 2% 63V
2424	4822 126 13486	15pF 2% 63V
2425	4822 126 14118	100nF +80/-20% 50V
2426	4822 126 13751	47nF 10% 63V
2427	4822 122 33175	2,2nF 20% 50V
2428	4822 122 33177	10nF 20% 50V
2430	5322 116 80853	560pF 5% 63V
2431	4822 126 14118	100nF +80/-20% 50V
2432	5322 122 32531	100pF 5% 50V
2433	4822 126 13692	47pF 1% 63V
2434	4822 126 13692	47pF 1% 63V
2435	4822 126 13692	47pF 1% 63V
2436	4822 126 13692	47pF 1% 63V
2437	4822 126 13692	47pF 1% 63V
2439	4822 126 13196	100nF 10% 25V
2440	4822 124 22652	2,2µF 20% 50V
2441	4822 122 33177	10nF 20% 50V
2442	4822 122 33177	10nF 20% 50V
2443	4822 122 33177	10nF 20% 50V
2445	5322 116 80853	560pF 5% 63V

RESISTORS

3400	4822 117 13579	220k 1% 0.1W
3401	4822 117 11449	2k2 1% 0,1W
3402	4822 117 10833	10k 1% 0,1W
3403	4822 051 10102	1k 2% 0,25W
3405	4822 051 10102	1k 2% 0,25W
3406	4822 117 11139	1k5 1% 0,1W
3407	4822 050 11002	1k 1% 0,4W
3408	4822 051 10102	1k 2% 0,25W
3409	4822 051 10102	1k 2% 0,25W
3410	4822 051 20392	3k9 5% 0,1W
3411	4822 051 10102	1k 2% 0,25W
3412	4822 051 20392	3k9 5% 0,1W
3413	4822 051 10102	1k 2% 0,25W
3416	4822 051 10102	1k 2% 0,25W
3417	4822 117 11139	1k5 1% 0,1W
3419	4822 117 11139	1k5 1% 0,1W
3420	4822 051 10102	1k 2% 0,25W
3421	4822 051 10102	1k 2% 0,25W
3422	4822 051 10102	1k 2% 0,25W
3423	4822 051 10102	1k 2% 0,25W
3424	4822 051 10102	1k 2% 0,25W
3425	4822 051 10102	1k 2% 0,25W
3426	4822 051 10102	1k 2% 0,25W
3427	4822 051 10102	1k 2% 0,25W
3428	4822 051 10102	1k 2% 0,25W
3429	4822 051 10102	1k 2% 0,25W
3430	4822 051 10102	1k 2% 0,25W
3431	4822 051 10102	1k 2% 0,25W
3433	4822 117 11139	1k5 1% 0,1W
3434	4822 051 10102	1k 2% 0,25W
3435	4822 051 10102	1k 2% 0,25W
3436	4822 051 10102	1k 2% 0,25W
3437	4822 051 10102	1k 2% 0,25W
3438	4822 051 10102	1k 2% 0,25W
3439	4822 051 10102	1k 2% 0,25W
3440	4822 051 10102	1k 2% 0,25W
3441	4822 051 10102	1k 2% 0,25W
3442	4822 051 10102	1k 2% 0,25W

6-4

ELECTRICAL PARTS LIST - FRONT BOARD

3443	4822 051 10102	1k 2% 0,25W
3444	4822 051 10102	1k 2% 0,25W
3445	4822 051 10102	1k 2% 0,25W
3446	4822 051 10102	1k 2% 0,25W
3447	4822 051 10102	1k 2% 0,25W
3448	4822 117 11139	1k5 1% 0,1W
3449	4822 117 11139	1k5 1% 0,1W
3451	4822 051 10102	1k 2% 0,25W
3452	4822 117 11139	1k5 1% 0,1W
3453	4822 116 83884	47k 5% 0,5W
3454	4822 051 20331	330R 5% 0,1W
3455	4822 116 83884	47k 5% 0,5W
3456	4822 117 10833	10k 1% 0,1W
3457	4822 117 11139	1k5 1% 0,1W
3458	4822 116 83884	47k 5% 0,5W
3459	4822 117 10833	10k 1% 0,1W
3460	4822 116 83884	47k 5% 0,5W
3462	4822 051 20331	330R 5% 0,1W
3463	4822 116 52271	33k 5% 0,5W
3464	4822 117 10833	10k 1% 0,1W
3465	4822 116 83864	10k 5% 0,5W
3467	4822 051 20331	330R 5% 0,1W
3469	4822 051 10102	1k 2% 0,25W
3471	4822 050 24708	4R7 1% 0,6W
3472	4822 051 10102	1k 2% 0,25W
3474	4822 051 20331	330R 5% 0,1W
3475	4822 116 52243	1k5 5% 0,5W
3476	4822 051 20101	100R 5% 0,1W
3477	4822 051 20101	100R 5% 0,1W
3478	4822 051 10102	1k 2% 0,25W
3479	4822 051 20101	100R 5% 0,1W
3480	4822 051 20331	330R 5% 0,1W
3481	4822 051 10102	1k 2% 0,25W
3482	4822 051 10102	1k 2% 0,25W
3483	4822 050 24708	4R7 1% 0,6W
3484	4822 051 10102	1k 2% 0,25W
3485	4822 051 10102	1k 2% 0,25W
3486	4822 051 10102	1k 2% 0,25W
3488	4822 051 20331	330R 5% 0,1W
3489	4822 051 10102	1k 2% 0,25W
3490	4822 051 10102	1k 2% 0,25W
3493	4822 051 20331	330R 5% 0,1W
3494	4822 051 20331	330R 5% 0,1W
3495	4822 117 10833	10k 1% 0,1W
3496	4822 051 10102	1k 2% 0,25W
3497	4822 050 11002	1k 1% 0,4W
3498	4822 051 10102	1k 2% 0,25W
3499	4822 051 10102	1k 2% 0,25W
3500	4822 051 10102	1k 2% 0,25W
3501	4822 050 11002	1k 1% 0,4W
3502	4822 050 11002	1k 1% 0,4W
3503	4822 051 10102	1k 2% 0,25W
3504	4822 051 10102	1k 2% 0,25W
3505	4822 051 20331	330R 5% 0,1W
3506	4822 050 11002	1k 1% 0,4W
3507	4822 051 10102	1k 2% 0,25W
3508	4822 051 10102	1k 2% 0,25W
3509	4822 051 10102	1k 2% 0,25W
3510	4822 051 10102	1k 2% 0,25W
3511	4822 051 10102	1k 2% 0,25W
3512	4822 051 10102	1k 2% 0,25W
3513	4822 117 11449	2k2 1% 0,1W
3515	4822 051 20104	100k 5% 0,1W
3516	4822 051 20331	330R 5% 0,1W
3518	4822 051 20331	330R 5% 0,1W
3519	4822 051 20331	330R 5% 0,1W
3520	4822 117 10833	10k 1% 0,1W
3521	4822 051 10102	1k 2% 0,25W
3522	4822 051 20331	330R 5% 0,1W
3523	4822 051 20331	330R 5% 0,1W
3524	4822 051 10102	1k 2% 0,25W
3525	4822 051 10102	1k 2% 0,25W
3526	4822 051 20331	330R 5% 0,1W
3527	4822 051 10102	1k 2% 0,25W
3529	4822 051 20331	330R 5% 0,1W
3533	4822 117 10833	10k 1% 0,1W
3534	4822 117 10833	10k 1% 0,1W
3535	4822 117 10833	10k 1% 0,1W
3536	4822 051 20474	470k 5% 0,1W
3537	4822 051 20474	470k 5% 0,1W
3541	4822 051 10102	1k 2% 0,25W
3543	4822 051 10102	1k 2% 0,25W
3544	4822 117 10833	10k 1% 0,1W
3545	4822 051 10102	1k 2% 0,25W
3547	4822 051 10102	1k 2% 0,25W
3548	4822 051 10102	1k 2% 0,25W
3549	4822 116 83864	10k 5% 0,5W
3551	4822 051 20331	330R 5% 0,1W
3552	4822 051 20331	330R 5% 0,1W
3553	4822 117 10833	10k 1% 0,1W
3554	4822 117 10833	10k 1% 0,1W
3555	4822 117 10833	10k 1% 0,1W
3556	4822 051 20561	560R 5% 0,1W
3557	4822 051 20331	330R 5% 0,1W
3558	4822 117 10833	10k 1% 0,1W
3559	4822 051 20105	1M 5% 0,1W
3561	4822 051 20472	4k7 5% 0,1W
3562	4822 117 10833	10k 1% 0,1W
3563	4822 117 10833	10k 1% 0,1W
3564	4822 117 10833	10k 1% 0,1W
3565	4822 051 20472	4k7 5% 0,1W
3566	4822 117 10833	10k 1% 0,1W
3567	4822 117 10833	10k 1% 0,1W
3568	4822 117 10834	47k 1% 0,1W

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

3569	4822 051 20223	22k 5% 0,1W
3570	4822 051 20223	22k 5% 0,1W
3571	4822 116 52238	12k 5% 0,5W
3572	4822 117 10833	10k 1% 0,1W
3573	4822 051 20223	22k 5% 0,1W
3574	4822 051 20223	22k 5% 0,1W
3575	4822 050 21003	10k 5% 0,4W
3576	4822 117 10833	10k 1% 0,1W
3577	4822 117 11383	12k 1% 0,1W
3578	4822 051 20562	5k6 5% 0,1W
3581	4822 117 10833	10k 1% 0,1W
3586	4822 117 10834	47k 1% 0,1W
4401	4822 051 20008	0R Jumper 0805
4402	4822 051 20008	0R Jumper 0805
4407	4822 051 20008	0R Jumper 0805
4408	4822 051 20008	0R Jumper 0805
4409	4822 051 20008	0R Jumper 0805
4410	4822 051 20008	0R Jumper 0805
4411	4822 051 20008	0R Jumper 0805
4412	4822 051 20008	0R Jumper 0805
4413	4822 051 20008	0R Jumper 0805
4414	4822 051 20008	0R Jumper 0805
4415	4822 051 20008	0R Jumper 0805
4416	4822 051 20008	0R Jumper 0805
4417	4822 051 20008	0R Jumper 0805
4418	4822 051 20008	0R Jumper 0805
4419	4822 051 20008	0R Jumper 0805
4420	4822 051 20008	0R Jumper 0805
4421	4822 051 20008	0R Jumper 0805
4422	4822 051 20008	0R Jumper 0805
4423	4822 051 20008	0R Jumper 0805
4424	4822 051 20008	0R Jumper 0805
4425	4822 051 20008	0R Jumper 0805
4426	4822 051 20008	0R Jumper 0805
4427	4822 051 20008	0R Jumper 0805
4428	4822 051 20008	0R Jumper 0805
4429	4822 051 20008	0R Jumper 0805
4430	4822 051 20008	0R Jumper 0805
4431	4822 051 20008	0R Jumper 0805
4432	4822 051 20008	0R Jumper 0805
4433	4822 051 20008	0R Jumper 0805
4434	4822 051 20008	0R Jumper 0805
4435	4822 051 20008	0R Jumper 0805
4436	4822 051 20008	0R Jumper 0805
4437	4822 051 20008	0R Jumper 0805
4438	4822 051 20008	0R Jumper 0805
4439	4822 051 20008	0R Jumper 0805
4440	4822 051 20008	0R Jumper 0805
4441	4822 051 20008	0R Jumper 0805
4442	4822 051 20008	0R Jumper 0805
4443	4822 051 20008	0R Jumper 0805
4444	4822 051 20008	0R Jumper 0805
4445	4822 051 20008	0R Jumper 0805
4446	4822 051 20008	0R Jumper 0805
4447	4822 051 20008	0R Jumper 0805
4448	4822 051 20008	0R Jumper 0805
4449	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4503	4822 051 20008	0R Jumper 0805
4504	4822 051 20008	0R Jumper 0805
4505	4822 051 20008	0R Jumper 0805
4506	4822 051 20008	0R Jumper 0805
4507	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4514	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4525	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4527	4822 051 20008	0R Jumper 0805
4528	4822 051 20008	0R Jumper 0805
4529	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4538	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4603	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5400	4822 242 72066	Ceram Resonator 8MHz
5401	4822 242 70938	X'tal Resonator 32,768kHz
5402	4822 157 11477	Coil 2,2µH 5%
5403	4822 157 11477	Coil 2,2µH 5%
5405	4822 157 11477	Coil 2,2µH 5%

ELECTRICAL PARTS LIST - FRONT BOARD

COILS & FILTERS

5506	4822 157 11477	Coil 2,2µH 5%

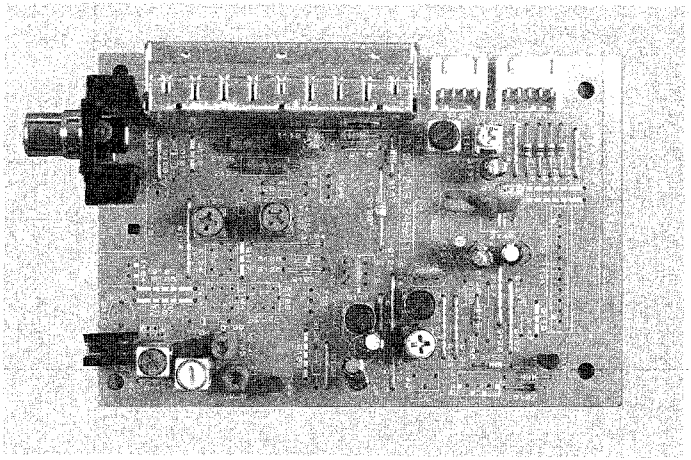
DIODES

6400	4822 130 10791	LTL-1CHGE
6401	4822 130 10791	LTL-1CHGE
6402	4822 130 10791	LTL-1CHGE
6403	4822 130 10791	LTL-1CHGE
6404	4822 130 10791	LTL-1CHGE
6405	4822 130 10791	LTL-1CHGE
6406	4822 130 10791	LTL-1CHGE
6407	4822 130 30621	1N4148
6408	4822 130 30621	1N4148
6409	4822 130 10791	LTL-1CHGE
6410	4822 130 10792	LTL-1CHPE
6411	4822 130 10792	LTL-1CHPE
6412	4822 130 10792	LTL-1CHPE
6413	4822 130 10792	LTL-1CHPE
6414	4822 130 10792	LTL-1CHPE
6415	4822 130 10791	LTL-1CHGE
6416	4822 130 10792	LTL-1CHPE
6417	4822 130 30621	1N4148
6418	4822 130 10792	LTL-1CHPE
6420	4822 130 30621	1N4148
6422	4822 130 30621	1N4148
6423	4822 130 31878	1N4003G
6425	4822 130 30621	1N4148
6426	4822 130 31878	1N4003G
6428	4822 130 30621	1N4148
6429	4822 130 10792	LTL-1CHPE
6431	4822 130 30621	1N4148
6432	4822 130 30621	1N4148
6433	4822 130 30621	1N4148
6434	4822 130 30621	1N4148
6435	4822 130 30621	1N4148
6436	4822 130 30621	1N4148
6437	4822 130 30621	1N4148
6438	4822 130 30621	1N4148
6439	4822 130 30621	1N4148
6440	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7400	4822 209 31981	SAA6579T
7401	3139 110 52150	TMP87CS71F "396S52151"
7402	4822 209 31508	ST24C01B1
7404	5322 209 11306	HEF4094BT
7405	5322 209 11306	HEF4094BT
7406	5322 209 11306	HEF4094BT
7408	4822 130 60511	BC847B
7409	4822 130 10165	GP1U28XP
7410	4822 130 60511	BC847B
7411	4822 130 60511	BC847B
7412	4822 130 60511	BC847B
7413	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service parts.



TUNER 95 BOARD

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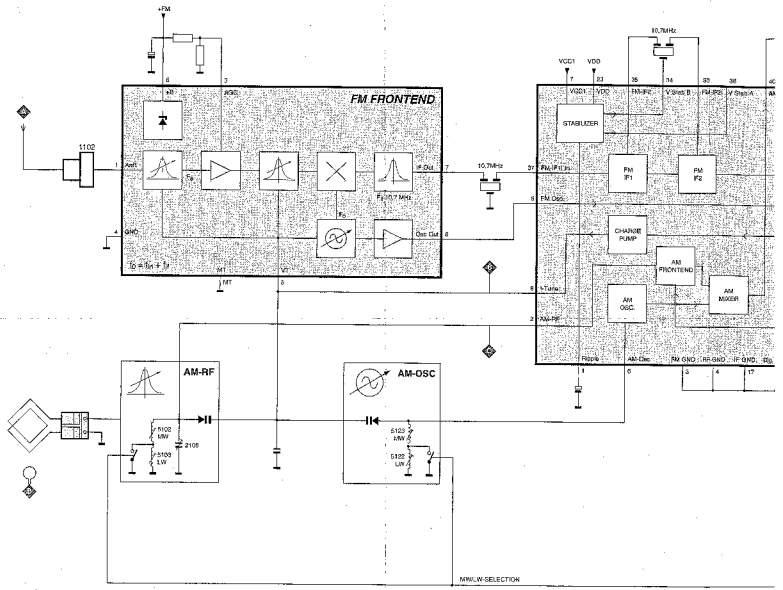
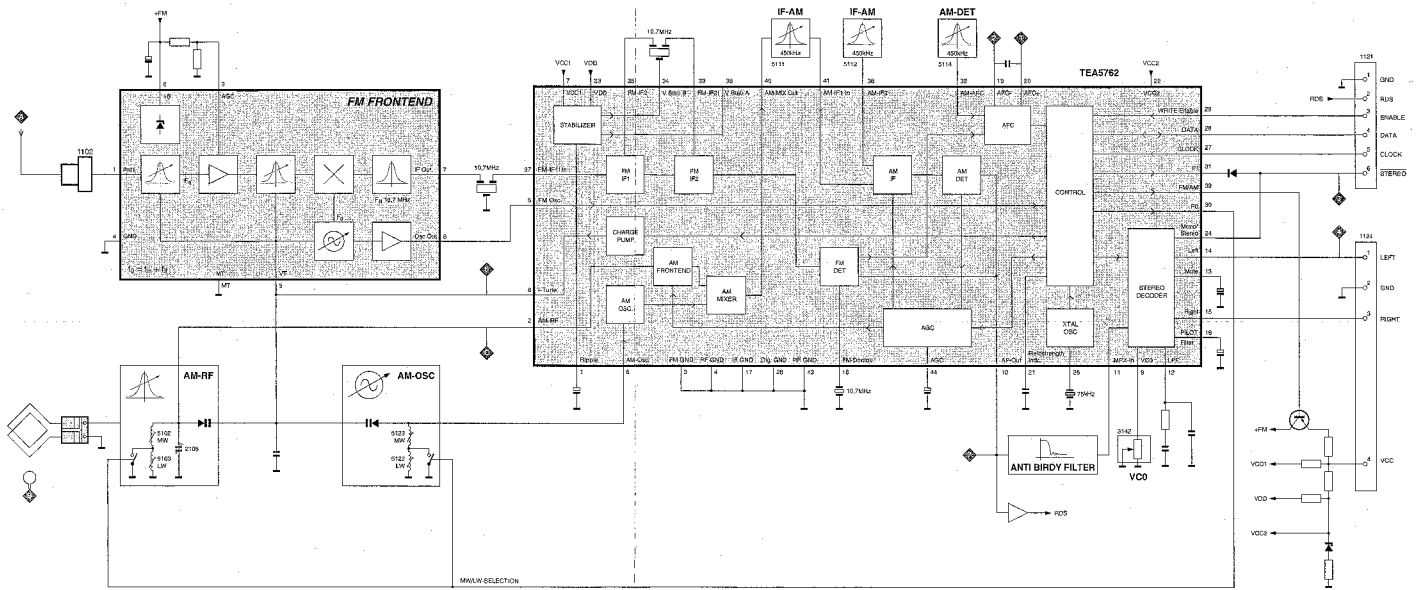
BLOCKDIAGRAM



7D-1

BLOCKDIAGRAM



TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

Waverange	Input frequency	Input	Set tuned to	Adjust	Output	Scope / Voltmeter
VARICAP ALIGNMENT						
FM (50)			108 MHz	check		7 ... 9V
87.5 - 108 MHz			87.5 MHz	check		1.3 ... 2V
MW (9)			1602 kHz	5123	◇6	8.3V ± 0.2V
531 - 1602 kHz			531 kHz	check		1V ± 0.4V
LW (3)			279 kHz	5122		8.3V ± 0.2V
153 - 279 kHz			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 MHz 1mV continuous wave *short pin 21 (IC7101) to ground*	◇A	98 MHz	5107	◇1 ◇2	0mV ± 3mV
FM – VCO						
FM	98 MHz 1 mV continuous wave	◇A	98 MHz	3142	◇3	152kHz ± 1 kHz
DISTORTION						
FM	98 MHz 1 mV 90 % L + 9 % pilot mod = 1kHz	◇A	98MHz	mixcoil inside Tuner 1110	◇4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal	100pF 50E ◇C	MW	5111	◇7	symmetrical and max. height
				5112		
	450kHz continuous wave			5114	◇1 ◇2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	◇B	558kHz	5102	◇7	MAX
			1494kHz	2106		
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

adjtable for 3104 217 04121/04341

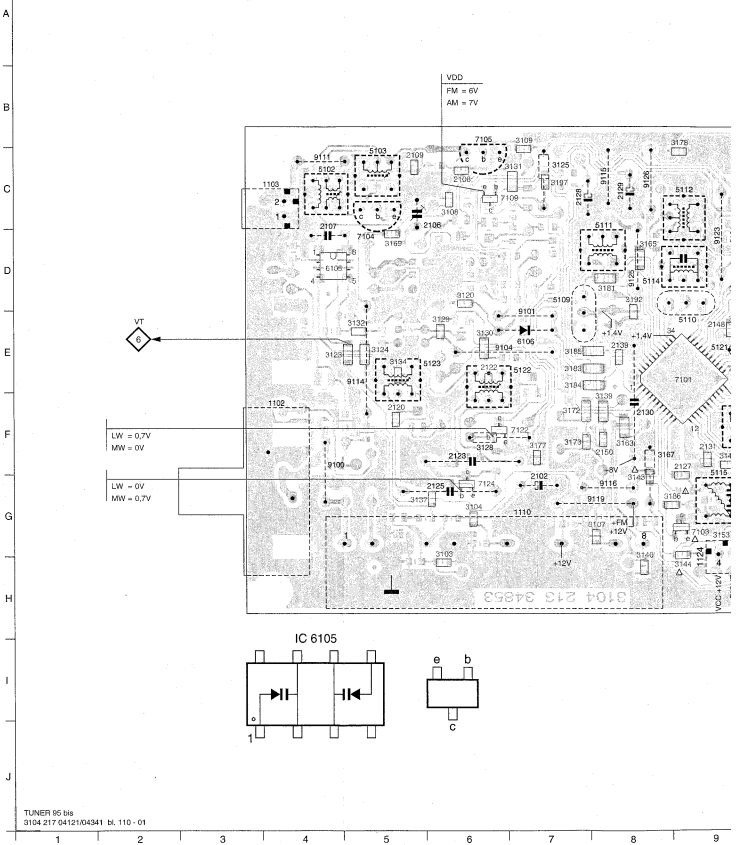
* Signal send via a frame antenna
(..) = tuning grid in kHz

↕ repeat

1102	F4	2107	C4	2128	C7	2136	G10	2144	E10	2160	E9	3120	D6	3132	E5	3143	G8	3153	G9	3163	F8	3176	D9	3188
1103	C4	2108	C6	2129	C8	2137	E11	2145	G11	2161	E9	3123	E4	3134	E5	3144	H9	3154	C10	3164	C11	3177	F7	3192
1110	G7	2109	C5	2130	F8	2138	E10	2147	G11	2162	C11	3124	E5	3137	G5	3145	F9	3155	C10	3165	D8	3178	B8	3197
1121	H11	2120	F5	2131	F9	2139	E8	2148	E9	3103	H6	3125	C7	3138	D9	3146	B10	3158	G11	3167	F8	3181	D8	5102
1124	H9	2122	E6	2132	F9	2140	F10	2150	F8	3104	G6	3128	F6	3139	F8	3147	H9	3159	G11	3169	D5	3183	E7	5103
1126	G10	2123	F6	2133	F10	2141	E10	2151	F9	3107	G7	3129	E6	3140	H8	3150	C11	3160	G11	3171	D11	3184	E7	5107
2102	G7	2125	G6	2134	G10	2142	E9	2152	F9	3108	C6	3130	E6	3141	G9	3151	C10	3161	G11	3172	F7	3185	E7	5109
2106	C5	2127	F9	2135	G11	2143	C10	2158	D10	3109	B7	3131	C6	3142	G10	3152	G9	3162	D9	3173	F7	3186	G8	5110

1 2 3 4 5 6 7 8 9

TUNER 95 bis Combi: Copper side view



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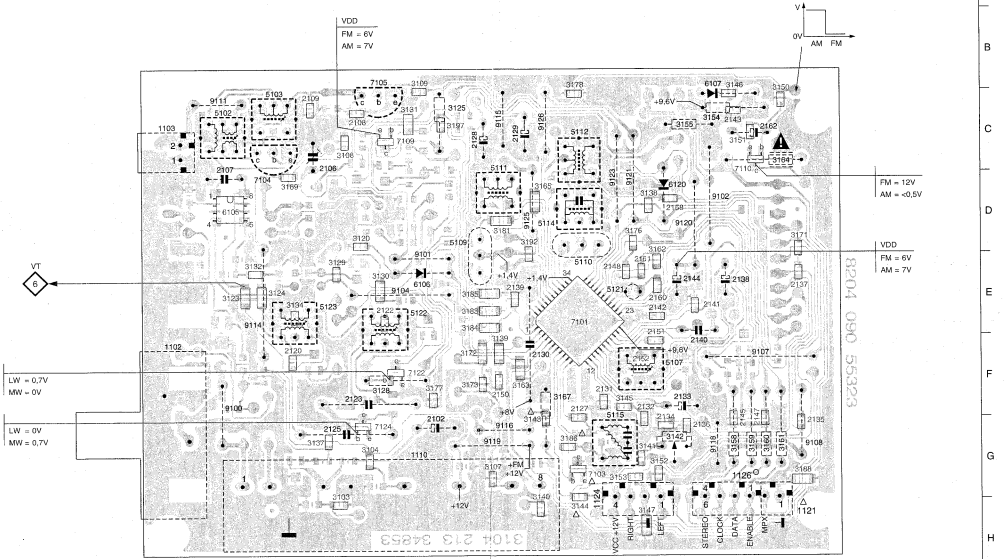
1102	F4	2107	C4	2128	C7	2136	G10	2144	E10	2160	E9	3120	D6	3132	E5	3143	G8	3153	G9	3163	F8	3176	D9	3188	G11	5111	C8	6106	E7	7110	D11	9108	G11	9121	D9
1103	C4	2108	C6	2129	C8	2137	E11	2145	G11	2161	E9	3123	E4	3134	E5	3144	H9	3154	C10	3164	C11	3177	F7	3192	D8	5112	C9	6107	B10	7122	F7	9111	C4	9123	D9
1110	G7	2109	C5	2130	F8	2138	E10	2147	G11	2162	C11	3124	E5	3137	G5	3145	F9	3155	C10	3165	D8	3178	B8	3197	C7	5114	D8	6120	D10	7124	G6	9114	E5	9125	D8
1121	H11	2120	F5	2131	F9	2139	E8	2148	E9	3103	H6	3125	C7	3138	D9	3146	B10	3156	G11	3167	F8	3181	D8	5102	C4	5115	G9	7101	E9	9100	F4	9115	C8	9126	C8
1124	H9	2122	E6	2132	F9	2140	F10	2150	F8	3104	G6	3128	F6	3139	F8	3147	H9	3159	G11	3169	D5	3183	E7	5103	C5	5121	E9	7103	G9	9101	E7	9116	G8		
1126	G10	2123	F6	2133	F10	2141	E10	2151	F9	3107	G7	3129	E6	3140	H8	3150	C11	3160	G11	3171	D11	3184	E7	5107	F10	5122	E7	7104	D5	9102	D10	9118	G10		
2102	G7	2125	G6	2134	G10	2142	E9	2152	F9	3108	C6	3130	E6	3141	G9	3151	C10	3161	G11	3172	F7	3185	E7	5109	D7	5123	E5	7105	B6	9104	E6	9119	G7		
2106	C5	2127	F9	2135	G11	2143	C10	2158	D10	3109	B7	3131	C6	3142	G10	3152	G9	3162	D9	3173	F7	3186	G8	5110	E9	6105	D4	7109	C6	9107	F11	9120	D10		

TUNER 95 bis Combi: Copper side view



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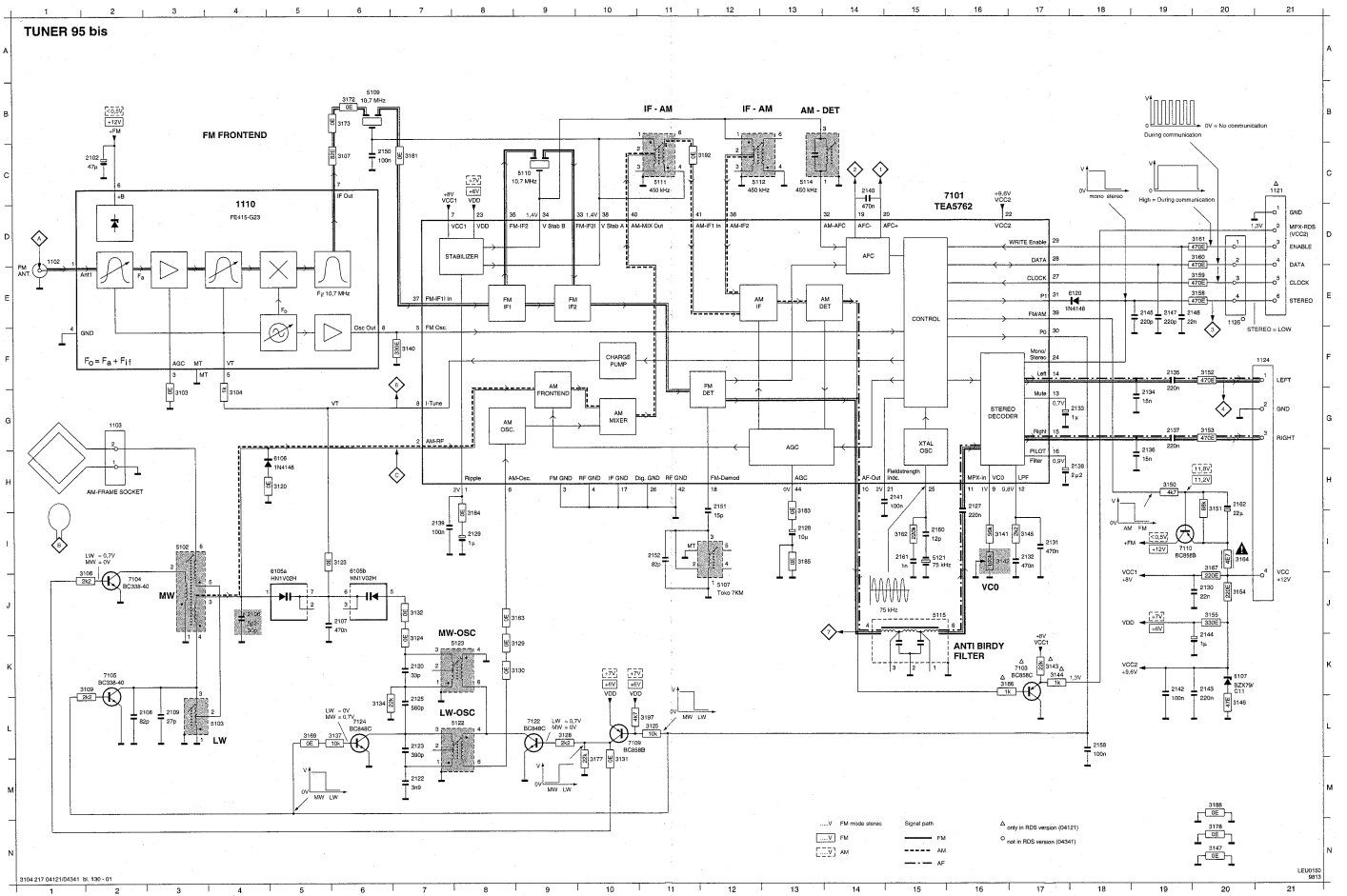
TUNER 95 bis
FM FRONTEND
1110
FE415-G29
IF - AM
IF - AM
AM - DET
7101
TEA5762
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
APC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
ANTI BIRDY FILTER
VCO
MW-OSC
LW-OSC
MW
LW
AM-FRAME SOCKET
Toko 7KM
During communication
mono stereo
High = During communication
0V = No communication
STEREO = LOW
GND
MPX-RDS /VCO2I
ENABLE
DATA
CLOCK
STEREO
LEFT
RIGHT
only in RDS version (04121)
not in RDS version (04341)
FM mode stereo
FM
AM
AF
Signal path
3104 217 04121/04341 bl. 190 - 01
LEU0150
9813

ELECTRICAL PARTS LIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	Socket Coaxial IEC 75R
1103	4822 265 31184	JST Connector 2 pin
1110	4822 210 10739	Frontend Assembly FE415-G23

CAPACITORS

2102	4822 124 40433	47µF 20% 25V
2106	4822 125 60102	Trimmer 5,2-30pF 100V
2107	4822 121 51252	470nF 5% 63V
2108	4822 126 13695	82pF 1% 63V
2109	4822 126 13691	27pF 1% 63V
2120	5322 122 32659	33pF 5% 50V
2122	5322 126 10465	3,9nF 10% 50V
2123	4822 121 10766	390pF 1% 630V
2125	4822 121 10578	560pF 1% 630V
2127	4822 122 32927	220nF +80/-20% 50V
2128	4822 124 41579	10µF 20% 50V
2129	4822 124 40242	1µF 20% 63V
2130	4822 126 11585	22nF +80/-20% 25V
2131	4822 122 33325	470nF 16V
2132	4822 122 33325	470nF 16V
2133	4822 124 40242	1µF 20% 63V
2134	4822 126 13188	15nF 5% 63V
2135	4822 122 32927	220nF +80/-20% 50V
2136	4822 126 13188	15nF 5% 63V
2137	4822 122 32927	220nF +80/-20% 50V
2138	4822 124 41576	2,2µF 20% 50V
2139	4822 126 10002	100nF 20% 25V
2140	4822 121 51252	470nF 5% 63V
2141	4822 122 31947	100nF 20% 63V
2142	4822 122 31947	100nF 20% 63V
2143	4822 122 32927	220nF +80/-20% 50V
2144	4822 124 40242	1µF 20% 63V
2145	4822 122 33575	220pF 5% 50V
2147	4822 122 33575	220pF 5% 50V
2148	4822 122 33809	22nF 20% 50V
2150	4822 122 31947	100nF 20% 63V
2151	4822 126 14236	15pF 5% 50V
2152	4822 126 13695	82pF 1% 63V
2158	4822 122 31947	100nF 20% 63V
2160	4822 122 32139	12pF 2% 63V
2161	5322 122 34123	1nF 10% 50V
2162	4822 124 81151	22µF 50V

RESISTORS

3103	4822 051 20008	0R Jumper 0805
3104	4822 051 10102	1k 2% 0,25W
3107	4822 051 20829	82R 5% 0,1W
3108	4822 117 11449	2k2 1% 0,1W
3109	4822 117 11449	2k2 1% 0,1W
3120	4822 051 20008	0R Jumper 0805
3123	4822 051 10008	0R Jumper 1206
3124	4822 051 10008	0R Jumper 1206
3125	4822 116 83864	10k 5% 0,5W
3128	4822 116 52256	2k2 5% 0,5W
3129	4822 051 20008	0R Jumper 0805
3130	4822 051 10008	0R Jumper 1206
3131	4822 051 10008	0R Jumper 1206
3132	4822 051 20008	0R Jumper 0805
3134	4822 051 20223	22k 5% 0,1W
3137	4822 117 10833	10k 1% 0,1W
3138	4822 051 20008	0R Jumper 0805
3139	4822 051 10008	0R Jumper 1206
3140	4822 051 20331	330R 5% 0,1W
3141	4822 117 11148	56k 1% 0,1W
3142	4822 100 11163	Trimmer 100k 30% 0,1W
3143	4822 051 20223	22k 5% 0,1W
3144	4822 051 10102	1k 2% 0,25W
3145	4822 117 11449	2k2 1% 0,1W
3146	4822 051 20479	47R 5% 0,1W
3147	4822 051 10008	0R Jumper 1206
3150	4822 051 20472	4k7 5% 0,1W
3151	4822 051 20683	68k 5% 0,1W
3152	4822 051 20471	470R 5% 0,1W
3153	4822 051 20471	470R 5% 0,1W
3154	4822 116 83872	220R 5% 0,5W
3155	4822 116 52219	330R 5% 0,5W
3158	4822 116 83883	470R 5% 0,5W
3159	4822 116 83883	470R 5% 0,5W
3160	4822 116 83883	470R 5% 0,5W
3161	4822 116 83883	470R 5% 0,5W
3162	4822 117 13579	220k 1% 0,1W
3163	4822 051 10008	0R Jumper 1206
3164	4822 052 10478 ⚠	4R7 5% 0,33W
3165	4822 051 10008	0R Jumper 1206
3167	4822 116 83872	220R 5% 0,5W
3169	4822 051 20008	0R Jumper 0805
3171	4822 051 20008	0R Jumper 0805
3172	4822 051 10008	0R Jumper 1206
3173	4822 051 20008	0R Jumper 0805
3176	4822 051 20008	0R Jumper 0805
3177	4822 051 20223	22k 5% 0,1W
3178	4822 051 10008	0R Jumper 1206
3181	4822 051 10008	0R Jumper 1206
3183	4822 051 10008	0R Jumper 1206
3184	4822 051 10008	0R Jumper 1206
3185	4822 051 10008	0R Jumper 1206
3186	4822 051 10102	1k 2% 0,25W
3188	4822 051 10008	0R Jumper 1206
3192	4822 051 20008	0R Jumper 0805
3197	4822 051 20472	4k7 5% 0,1W

COILS & FILTERS

5102	4822 157 71634	MW Aerial
5103	4822 157 71635	LW Aerial
5107	4822 157 11443	FM Discriminator 10,7MHz
5109	4822 157 71639	Ceram Filter 10,7MHz
5110	4822 242 70665	Ceram Filter 10,7MHz
5111	4822 158 60511	AM-IF Filter 450kHz
5112	4822 157 70302	AM-IF Filter 450kHz
5114	4822 157 70302	AM_IF Filter 450kHz
5115	4822 157 71636	Anti-Birdy Filter
5121	4822 242 10261	X'tal Resonator 75kHZ
5122	4822 157 60517	RF Coil AM
5123	4822 157 60517	RF Coil AM

DIODES

6105	4822 130 83075	HN1V02H-B
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

Note : Only the parts mentioned in this list are normal service spare parts.

ETF6-FE TAPE MODULE

(Non-Dolby Version)

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Analog Circuit diagram 9-7
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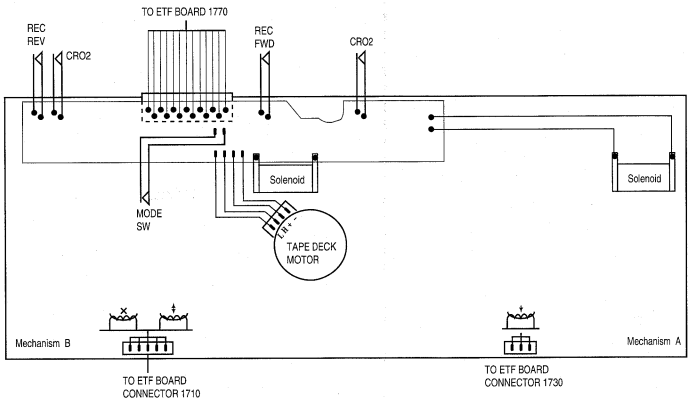
9-1

Tapedeck wiring (Double deck)



OPTIONS / VARIANTS TABLE

MODULE	ETF6-FE	
VARIANT	1	2
NAME	ND/DD/FR	ND/DD/FF
Deck configuration	double	double
Autoreverse	yes (B)	no
Auto-replay	no	yes (B)
Motor configuration	single	single
Auto tape type selection	yes	yes
Dolby B type Noise Reduction	no	no
19 kHz pilot suppression	no	no
High speed dubbing	yes	yes

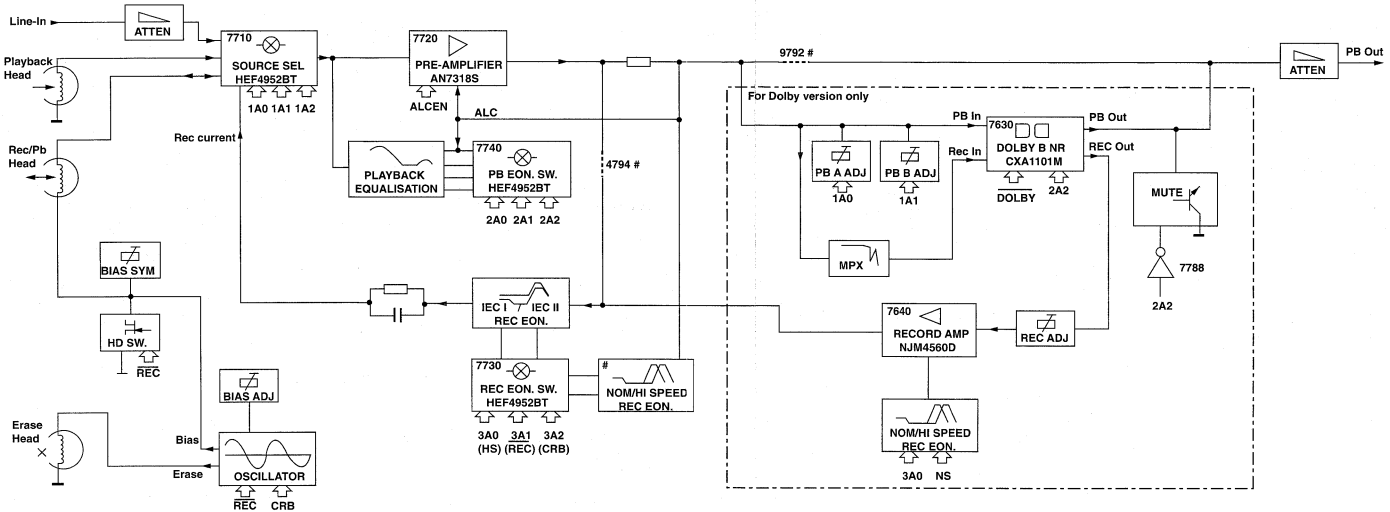
DB = Dolby B NR
DD = Double Deck
FF = Non-Autoreverse
FR = Autoreverse Deck B
ND = Non-Dolby
SD = Single Deck

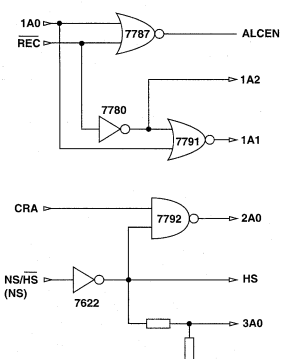
Variations table for Analog Circuit

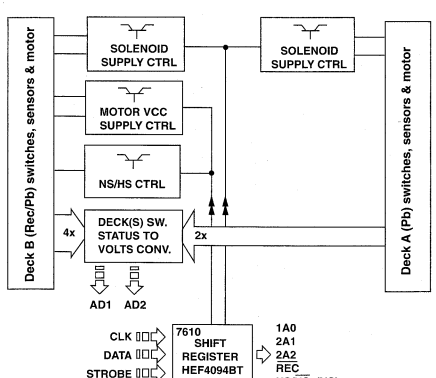
	Autoreverse	Non-autoreverse
	ND/DD/FR	ND/DD/FF
1760	-	-
1770	use	use
3723	12k	15k
3724	12k	15k
3743	1k2	1k
3744	1k2	1k
3769	12k	8k2
3772	4k7	5k6
3774	10k	8k2

9-2

BLOCK DIAGRAM







NOTE: # For Non-dolby version only
Only 1 channel is presented.

MicroProcessor Control / Communication lines

Direct / Indirect Control lines from Shift Registers

Brief introduction

General

1. Playback Mode
   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952B). The signal is amplified by amplifier IC7720 (AN7318S) before feeding to the IC7740 (HEF4952B) and out to the AF Board via connector 1701.

2. Recording Mode
   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then amplified by the amplifier IC7720 (AN7318S). The amplified output signal will pass through IC7730 (HEF4952B) for record equalization and back to IC7710 (HEF4952B) before registered into the Rec/PB Head of Deck B.

3. Dubbing Mode
   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then equalised for playback mode by the amplifier IC7720 (AN7318S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector
   The Mode Selector IC7710 (HEF4952B) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC
   Amplifier IC7720 (AN7318S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)
   ALC circuit consists of resistors (3760, 3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby only)
   Switch S4 of the IC7740 (HEF4952B) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952B)
   The function of the IC7740 (HEF4952B) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952B)
   The function of the IC7730 (HEF4952B) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level
    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby only)
    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch
    Playback Switch which consists of the FETs 7785 (For Dolby only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

9-3

13. Motor Speed
    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

14. IC7610 (HEF4094BT)
    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952B) via 1A0, 2A1 and 2A2. It also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is controlled via NS/HS.

Dolby Circuit (For sets with Dolby B NR only)

15. IC7630 (CXA1551M)
    IC7630 (CXA1101M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/LOW for NR OFF/ON.

16. 19kHz Filter
    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

17. Level Adjust
    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

18. Amplifier IC7640 (NJM4560M)
    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

19. Muting Circuit
    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non Auto Reverse
FR	Auto Reverse on Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

9-4

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 — INTERCONNECTION TO AF BOARD

1	REC-L	Record input left
2	REC-R	Record input right
3	GND A	AF Ground
4	TAPE-L	Playback output left
5	+12V	D.C. supply (+12V) in
6	TAPE-R	Playback output right
7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 — INTERCONNECTION TO AF BOARD

1	GND M	Motor Ground
2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 — INTERCONNECTION TO FRONT BOARD

1	AD2	Deck sensing switches output voltage / Deck A EOT
2	AD1	Deck sensing switches output voltage / Deck B EOT
3	+5	DC supply +5V for ADC network
4	GND P	Control & Oscillator Ground
5	CLK	HEF4094BT shift register Clock line
6	DATA	HEF4094BT shift register Data line
7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 — DECK B HEADS CONNECTON ***(For ETF6... only)***

1	B R/P HD L+	R/P Head left channel positive
2	GND A	R/P Head return ground
3	B R/P HD R+	R/P Head right channel positive
4	ERASE HEAD	Erase Head
5	GND A	Erase Head ground

CONNECTOR 1720 — DECK B HEADS CONNECTON ***(For ETF5... only)***

1	B R/P HD L+	R/P Head left channel positive
2	B R/P HD L-	R/P Head left channel negative
3	B R/P HD R+	R/P Head right channel positive
4	B R/P HD R-	R/P Head right channel negative
5	ERASE HEAD	Erase Head
6	GND A	Erase Head ground

CONNECTOR 1730 — DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***

1	A PB HD L+	Pb Head left channel positive
2	GND A	Pb Head return ground shield
3	A PB HD R+	Pb Head right channel positive

CONNECTOR 1740 — DECK B CONTROL INTERFACE ***(For ETF5... Double Deck only)***

1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply	
6	Vcc	Deck / Motor supply	
7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	H	H pin for motor	
10	L	L pin for motor	

CONNECTOR 1750 — DECK A CONTROL INTERFAC ***(For ETF5... Double Deck only)***

1	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
2	PHOTO A	Photo sensor output (tape movement indication)	
3	SOL A	Solenoid supply	
4	Vcc	Deck/Motor supply	
5	MODE	Mode switch (head engagement)	[open=off: close=engaged]
6	GND M	Deck/Motor ground	

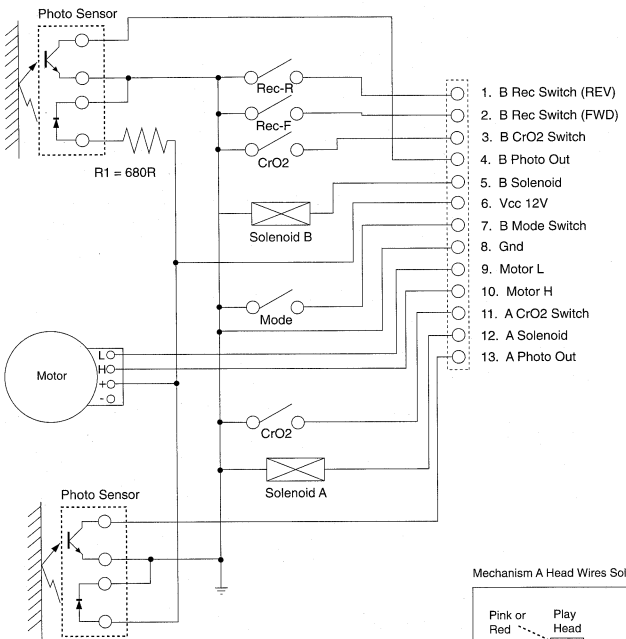
CONNECTOR 1760 — DECK B CONTROL INTERFACE ***(For Single Deck only)***

1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply	
6	Vcc	Deck / Motor supply	
7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	

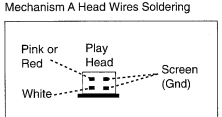
CONNECTOR 1770 — DECK A & B CONTROL INTERFACE ***(For ETF6... only)***

1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply for deck B	
6	Vcc	Deck / Motor supply	
7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	L	L pin for motor	
10	H	H pin for motor	
11	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
12	SOL A	Solenoid supply for deck A	
13	PHOTO A	Photo sensor output (tape movement indication)	

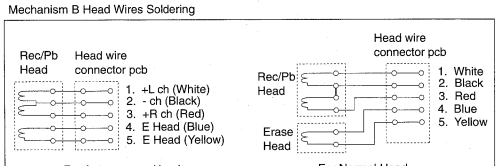
TAPE MECHANISM ELECTRONICS



Mechanism A Head Wires Soldering



Mechanism B Head Wires Soldering



9-5

TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
ADJUST MOTOR SPEED						
NORMAL SPEED	SBC420 3150Hz	PLAY B	1 or 2 LEFT RIGHT	frequency counter	3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 3150Hz	PLAY	1 or 2 LEFT RIGHT	W&F-meter	check	≤0.4 % DIN
ADJUST AZIMUTH						
DECK A & B	SBC420 10kHz	PLAY FWD	1 or 2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	
CHECK PLAYBACK FREQUENCY RESPONSE						
DECK A & B	SBC420	PLAY	1 or 2 LEFT RIGHT	mV-meter	check	limits see fig.1
ADJUST BIAS CURRENT						
DECK B	SBC419A	RECORD	5 or 6 LEFT RIGHT	mV-meter	3773	995mV
	SBC420				check	750mV ± 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via 3 or 4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2 LEFT RIGHT	mV-meter	check	limits see fig. 2 *
Inject 1kHz 8.85mV via 3 or 4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2 LEFT RIGHT	THD-meter	check	≤3% *

SBC419A : 4822 397 30069
SBC420 : 4822 397 30071

\# For Auto-reverse version only
* If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high, increase bias and re-meaure

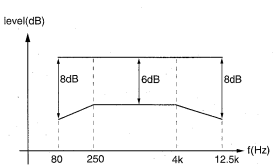


figure. 1

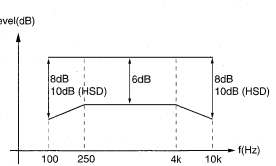
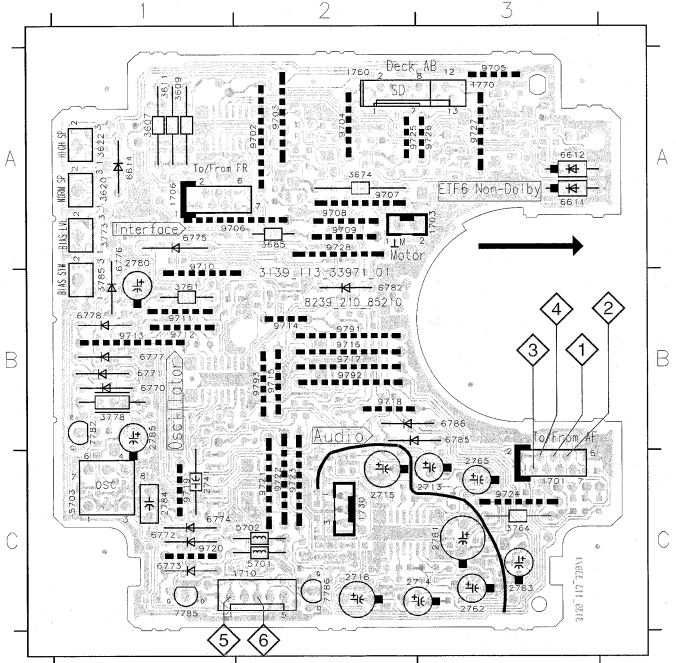


figure. 2

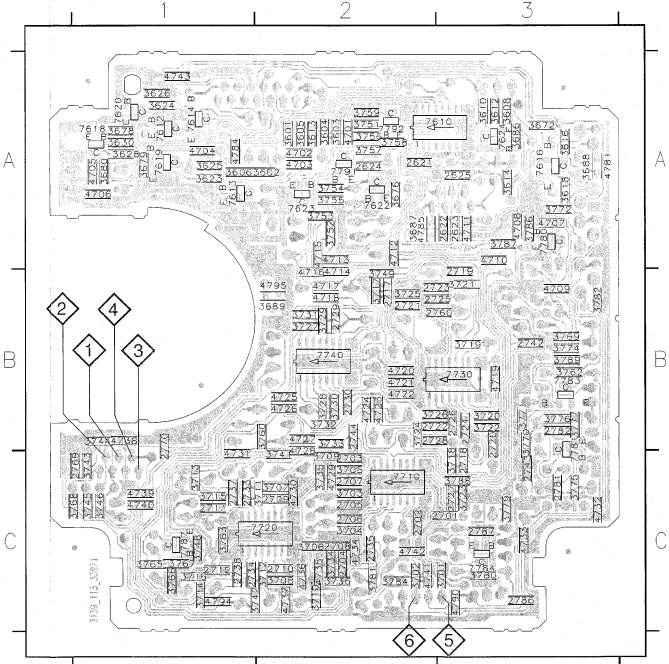
COMPONENT LAYOUT

1701 C3	2716 C2	3609 A1	3785 B1	6773 C1	7785 C1	9710 A1	9720 C1	9792 B2			
1703 A3	2741 C1	3611 A1	5701 C2	6774 C1	7786 C2	9711 B1	9721 C2	9793 B2			
1706 A1	2761 C3	3620 A1	5702 C2	6775 A1	9702 A2	9712 B1	9722 C2				
1710 C2	2762 C3	3622 A1	5703 C1	6776 A1	9703 A2	9713 B1	9723 C2				
1730 C2	2763 C3	3674 A2	6611 A3	6777 B1	9704 A2	9714 B2	9724 C3				
1760 A2	2765 C3	3685 A2	6612 A3	6778 B1	9705 A3	9715 B2	9725 A2				
1770 A3	2780 A1	3761 B1	6614 A1	6782 B2	9706 A1	9716 B2	9726 A3				
2713 C3	2784 C1	3764 C3	6770 B1	6785 B3	9707 A2	9717 B2	9727 A3				
2714 C3	2795 B1	3773 A1	6771 B1	6786 B3	9708 A2	9718 B2	9728 A2				
2715 C2	3607 A1	3778 B1	6772 C1	7782 B1	9709 A2	9719 C1	9791 B2				



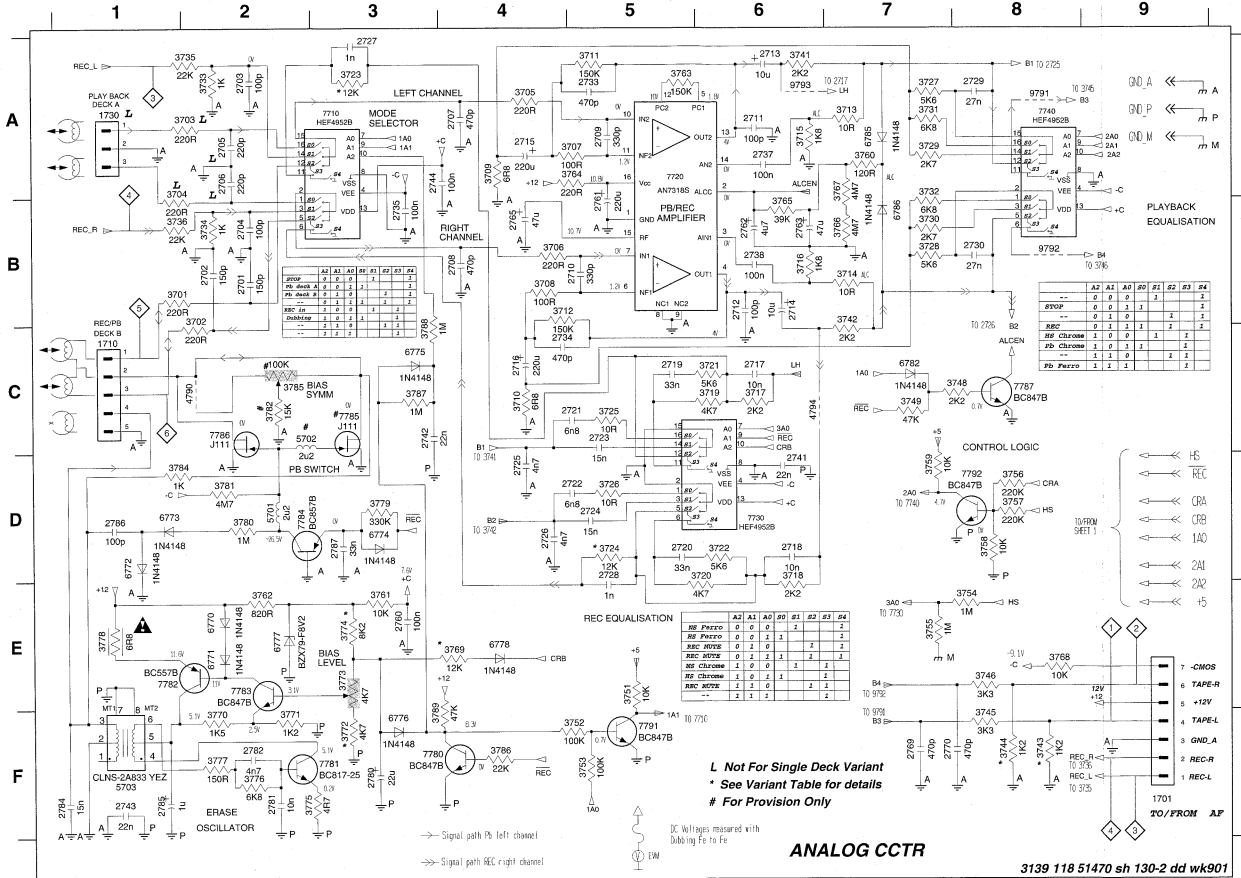
CHIP LAYOUT

2621 A2	2725 B3	3605 A2	3702 C2	3727 B2	3758 A2	3789 B3	4725 B2	7610 A3			
2622 A3	2726 B3	3606 A1	3703 C2	3728 B2	3759 A2	4701 A2	4726 B2	7612 A1			
2623 A3	2727 C3	3608 A3	3704 C2	3729 B2	3760 B2	4702 A2	4727 B2	7613 A1			
2624 A2	2728 B2	3610 A3	3705 C2	3730 B2	3762 B3	4703 A2	4728 C2	7614 A1			
2625 A3	2729 B2	3612 A3	3706 C2	3731 B2	3763 C1	4704 A1	4729 C2	7616 A3			
2701 C3	2730 B2	3613 A2	3707 C2	3732 B2	3765 C1	4705 A1	4730 C2	7618 A1			
2702 C2	2733 C1	3614 A3	3708 C2	3733 B2	3766 C1	4706 A1	4731 C1	7619 A1			
2703 C2	2734 C1	3616 A3	3709 C2	3734 C2	3767 C1	4707 A3	4732 C3	7620 A1			
2704 C2	2735 C2	3618 A3	3710 C2	3735 C2	3768 C1	4708 A3	4733 C3	7622 A2			
2705 C2	2737 C1	3623 A1	3711 C2	3736 C2	3769 B3	4709 B3	4734 C2	7623 A2			
2706 C2	2738 C1	3624 A1	3712 C2	3741 C1	3770 B3	4710 A3	4735 C2	7624 A3			
2707 C2	2742 B3	3625 A1	3713 C1	3742 C1	3771 B3	4711 A3	4736 C2	7710 C2			
2708 C2	2743 C3	3626 A1	3714 C1	3743 C1	3772 A3	4712 A2	4737 C2	7720 C2			
2709 C2	2744 B2	3628 A1	3715 C1	3744 B1	3774 B3	4713 A2	4738 B1	7730 B3			
2710 C2	2760 B3	3630 A1	3716 B2	3745 C1	3775 C3	4714 B2	4739 C1	7740 B2			
2711 C1	2769 C1	3672 A3	3717 B2	3746 C1	3776 B3	4715 A2	4740 C1	7780 A3			
2712 C1	2770 B1	3676 A2	3718 C3	3748 C1	3777 B3	4716 B2	4741 C2	7781 B3			
2717 B2	2781 C3	3678 A1	3719 B3	3749 B2	3778 C3	4717 B2	4742 C2	7783 B3			
2718 C3	2782 B3	3679 A1	3720 B3	3751 A2	3779 C3	4718 B2	4743 A1	7784 C3			
2719 B3	2786 C3	3680 A1	3721 B3	3752 A2	3781 C2	4719 B3	4781 A3	7787 C1			
2720 B3	2787 C3	3686 A3	3722 B3	3753 A2	3782 B3	4720 B2	4784 A1	7791 A2			
2721 B2	3601 A2	3687 A2	3723 C3	3754 A2	3784 C2	4721 B2	4785 A2	7792 A2			
2722 B2	3602 A2	3688 A3	3724 B2	3755 A2	3786 A3	4722 B2	4790 C3				
2723 B2	3603 A2	3689 B2	3725 B2	3756 A2	3787 A3	4723 B2	4794 C1				
2724 B3	3604 A2	3701 C3	3726 B2	3757 A2	3788 C3	4724 B2	4795 B2				



9-7

ANALOG CIRCUIT

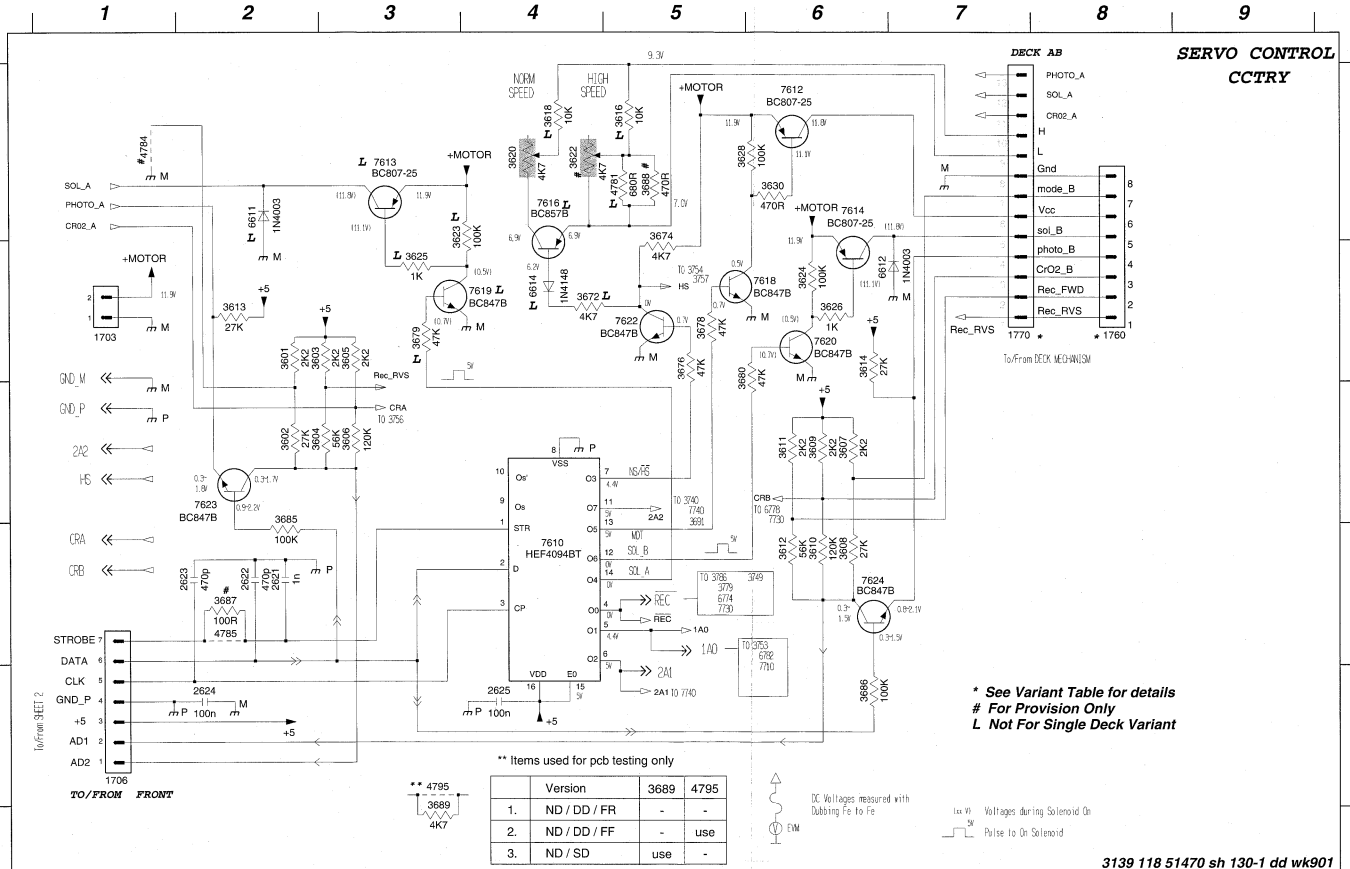


1701 F9	3716 B6	5703 F1
1710 C1	3717 C6	6770 E2
1730 A1	3718 D6	6771 D2
2701 B2	3719 C6	6772 D1
2702 B2	3720 D6	6773 D1
2703 A2	3721 C6	6774 D3
2704 B2	3722 D6	6775 C3
2705 A2	3723 A3	6776 F3
2706 A2	3724 D5	6777 E2
2707 A4	3725 C5	6778 E4
2708 B4	3726 D5	6782 C7
2709 A5	3727 A7	6785 A7
2710 B5	3728 B7	6786 B7
2711 A6	3729 A7	7710 A3
2712 B6	3730 B7	7720 A5
2713 A6	3731 A7	7730 D6
2714 B6	3732 A7	7740 A8
2715 A4	3733 A2	7780 F4
2716 C4	3734 B2	7781 F3
2717 C6	3735 A2	7782 E1
2718 D6	3736 B1	7783 E2
2719 C5	3741 A6	7784 D2
2720 D5	3742 B7	7785 C3
2721 C5	3743 F8	7786 C2
2722 D5	3744 F8	7787 C8
2723 C5	3745 F8	7791 F5
2724 D5	3746 E8	7792 D8
2725 D4	3748 C8	9791 A8
2726 D4	3749 C7	9792 B8
2727 A3	3751 E5	9793 A6
2728 D5	3752 F5	
2729 A8	3753 F5	
2730 B8	3754 E8	
2733 A5	3755 E7	
2734 C4	3756 D8	
2735 B3	3757 D8	
2737 A6	3758 D8	
2738 B6	3759 D7	
2741 D6	3760 A7	
2742 C3	3761 E3	
2743 F1	3762 E2	
2744 A3	3763 A5	
2760 E3	3764 A5	
2761 B5	3765 B6	
2762 B6	3766 B7	
2763 B6	3767 A7	
2765 B4	3768 E8	
2769 F7	3769 E4	
2770 F7	3770 F2	
2780 F3	3771 F2	
2781 F2	3772 F3	
2782 F2	3773 E3	
2784 F1	3774 E3	
2785 F1	3775 F2	
2786 D1	3776 F2	
2787 D3	3777 F2	
3701 B1	3778 E1	
3702 B2	3779 D3	
3703 A2	3780 D2	
3704 A1	3781 D2	
3705 A4	3782 C2	
3706 B4	3784 D1	
3707 A5	3785 C2	
3708 B4	3786 F4	
3709 A4	3787 C3	
3710 C4	3788 C3	
3711 A5	3789 F3	
3712 B4	4790 C2	
3713 A7	4794 C6	
3714 B7	5701 D2	
3715 A6	5702 C2	

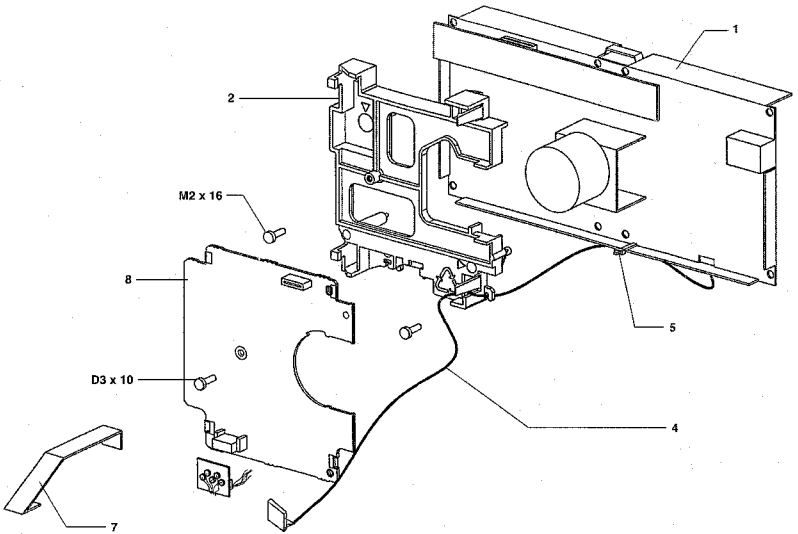
9-8

SERVO CONTROL CIRCUIT

1703 B1 1770 B7 2623 D2 3601 B2 3604 C2 3607 C6 3610 D6 3613 B2 3618 A4 3623 A3 3626 B6 3672 B4 3678 B5 3685 C2 3688 A5 4784 A1 6611 A2 7610 D4 7614 A6 7619 B4 7623 C2
1706 E1 2621 D2 2624 E2 3602 C2 3605 B3 3608 D6 3611 C6 3614 B6 3620 A4 3624 B6 3628 A5 3674 A5 3679 B3 3686 E6 3689 E3 4785 D2 6612 B6 7612 A6 7616 A4 7620 B6 7624 D6
1760 B8 2622 D2 2625 E4 3603 B2 3606 C3 3609 C6 3612 D6 3616 A5 3622 A4 3625 B3 3630 A6 3676 B5 3680 B5 3687 D2 4781 A5 4795 E3 6614 B4 7613 A3 7618 B6 7622 B5



	Version	3689	4795
1.	ND / DD / FR	-	-
2.	ND / DD / FF	-	use
3.	ND / SD	use	-



ETF6 TAPE MODULE EXPLODED VIEW

1	4822 691 10673	Autoreverse Mech. CWC44FR02
1	4822 691 10672	Non-Autoreverse Mech. CWC44FF01
7	4822 320 12245	Flex Cable 13 pin 7,5 cm

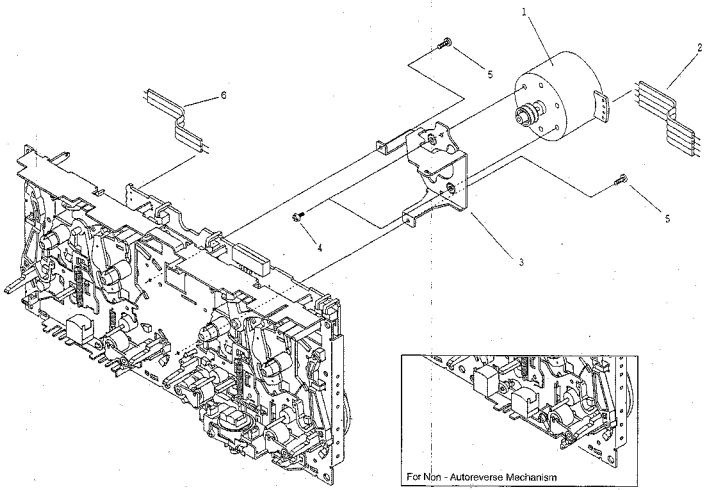
Note: Only the parts mentioned in this list are normal service spare parts.

9-9

TAPE MECHANISM - MOTOR EXPLODED VIEW

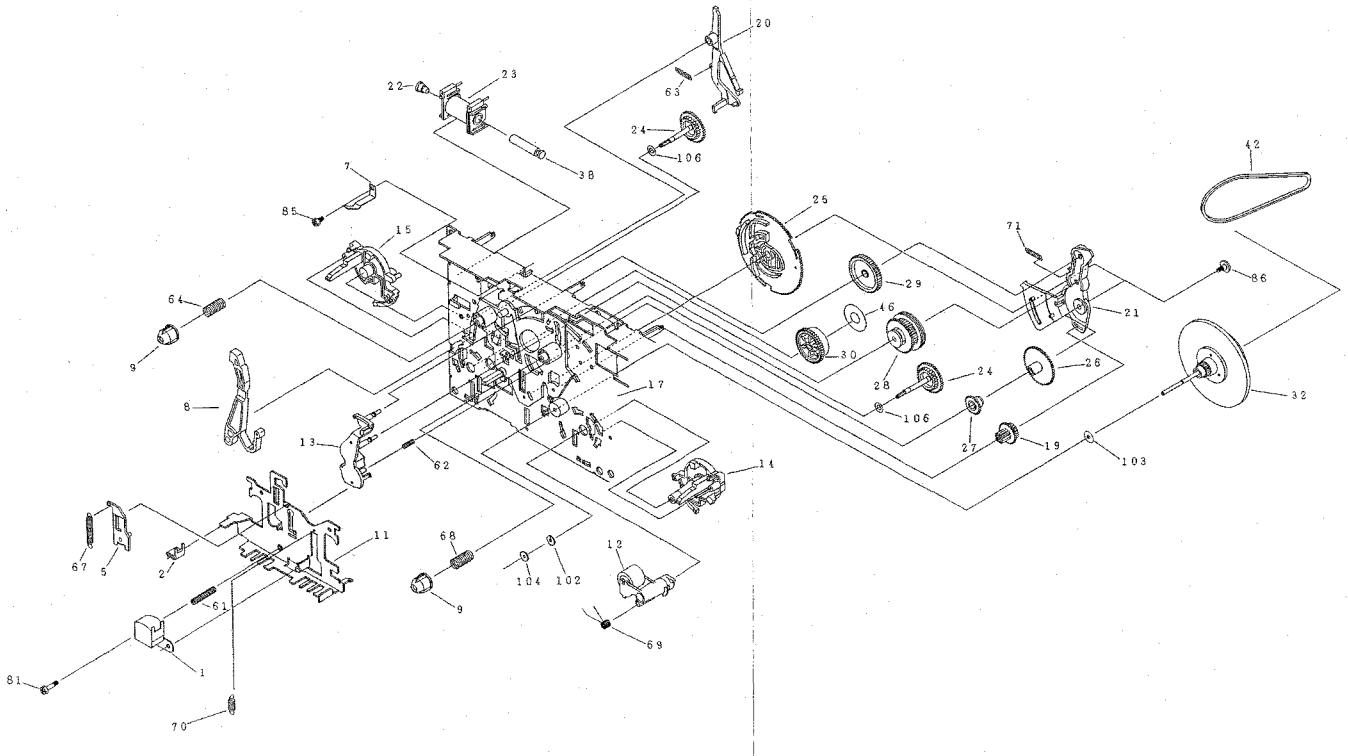
1	4822 361 11055	Motor Assembly
4	-	Screw M2,6 x 4
5	-	Screw M2 x 3

Note: Only the parts mentioned in this list are normal service spare parts.



9-10

TAPE MECHANISM A - PLAY



MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10397	MS15RAA2N1
12	4822 402 10972	Pinch Arm Assembly Right
23	4822 157 11498	Coil Assembly
32	4822 528 11244	Flywheel Assembly RV
42	4822 358 10168	Belt AF
69	4822 492 11542	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

Note: Only the parts mentioned in this list are normal service spare parts.

9-11

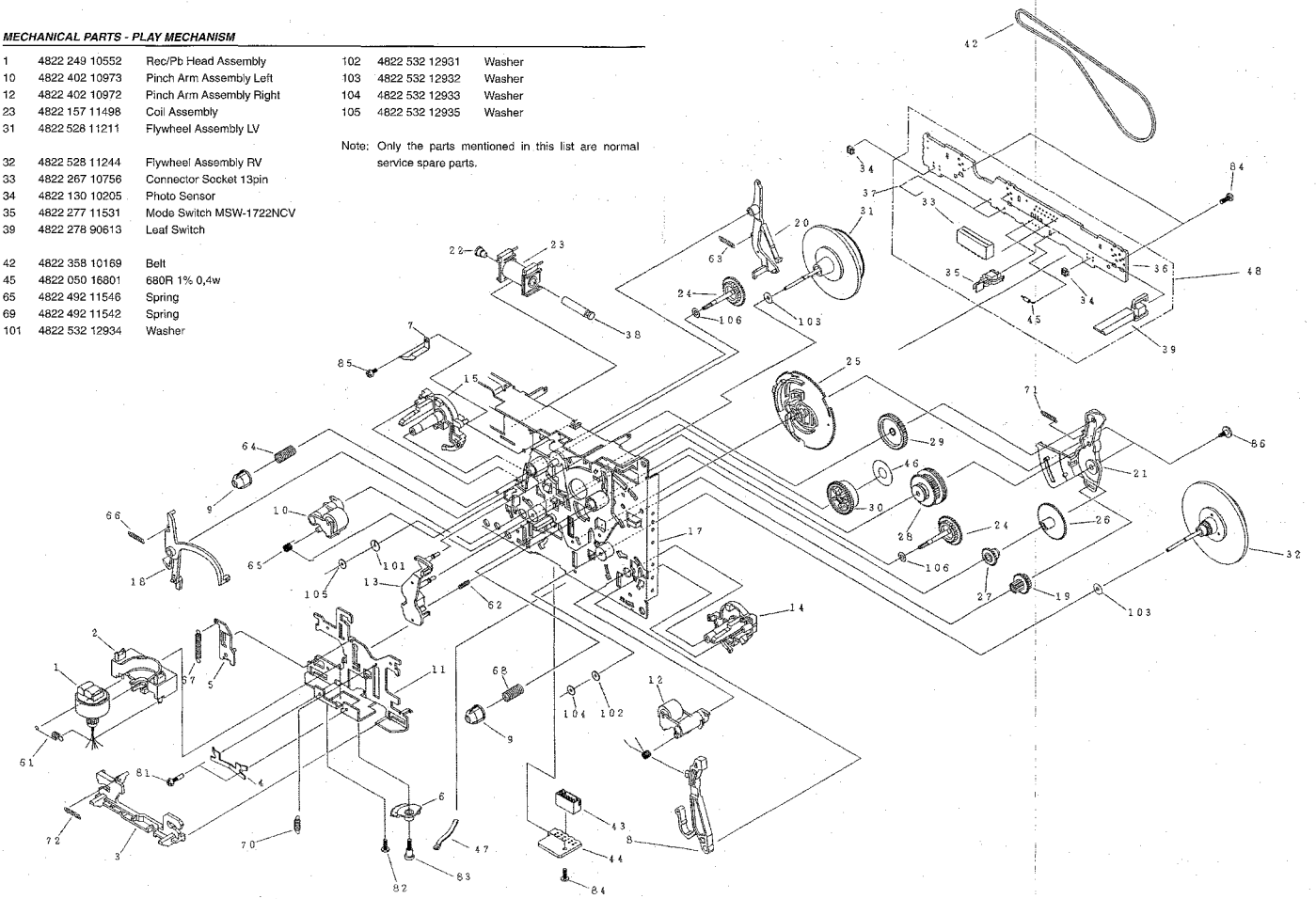
TAPE MECHANISM B - RECORD/PLAYBACK

(Autoreverse Version)

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10552	Rec/Pb Head Assembly
10	4822 402 10973	Pinch Arm Assembly Left
12	4822 402 10972	Pinch Arm Assembly Right
23	4822 157 11498	Coil Assembly
31	4822 528 11211	Flywheel Assembly LV
32	4822 528 11244	Flywheel Assembly RV
33	4822 267 10756	Connector Socket 13pin
34	4822 130 10205	Photo Sensor
35	4822 277 11531	Mode Switch MSW-1722NCV
39	4822 278 90613	Leaf Switch
42	4822 358 10169	Belt
45	4822 050 16801	680R 1% 0,4w
65	4822 492 11546	Spring
69	4822 492 11542	Spring
101	4822 532 12934	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
105	4822 532 12935	Washer

Note: Only the parts mentioned in this list are normal service spare parts.



9-12

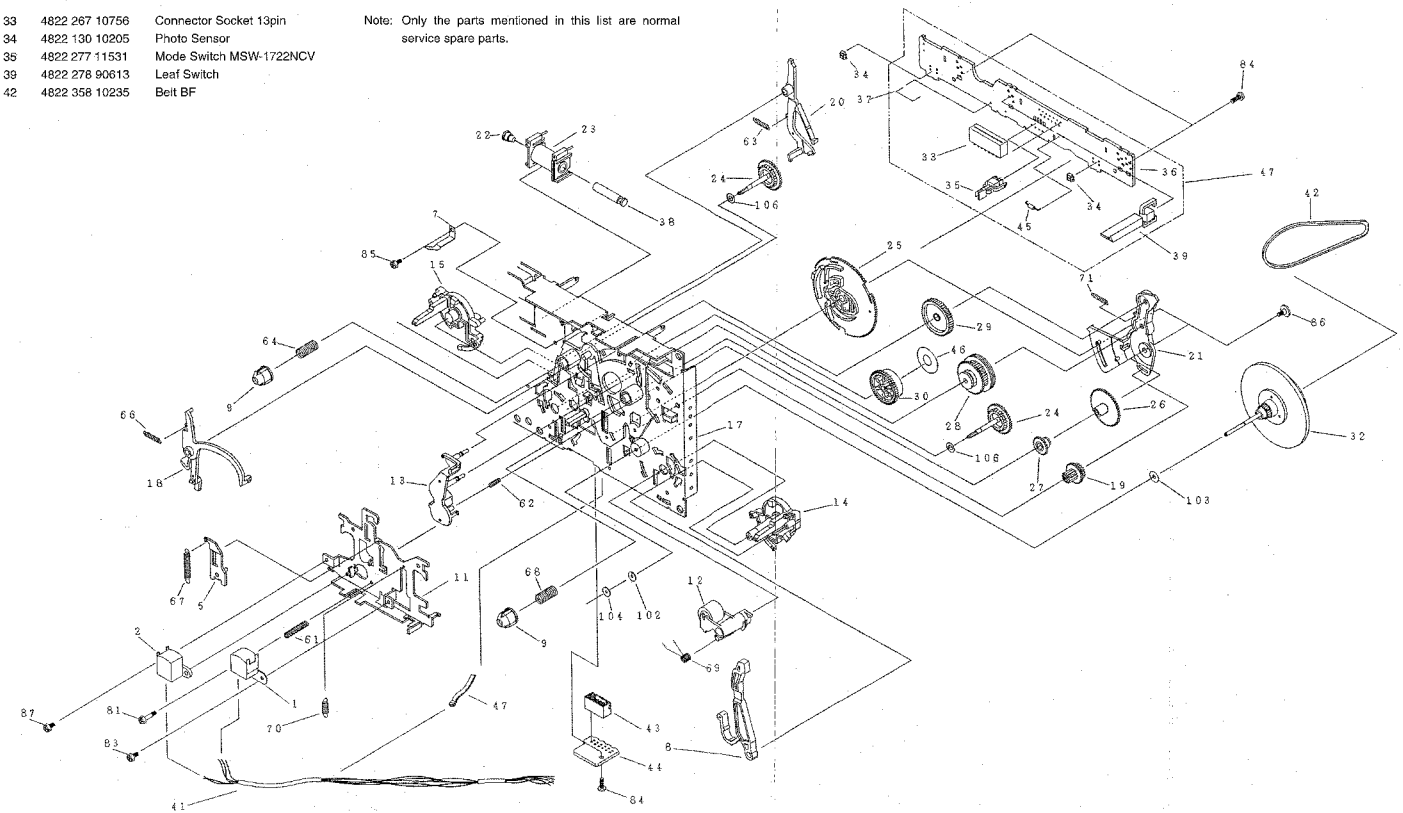
TAPE MECHANISM B - RECORD/PLAYBACK

(Non-Autoreverse Version)

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10397	Rec/Pb Head Assembly	45	4822 050 16801	680R 1% 0,4w
2	4822 249 40303	Erase Head	69	4822 492 11542	Spring
12	4822 402 10972	Pinch Arm Assembly Right	102	4822 532 12931	Washer
23	4822 157 11498	Coil Assembly	103	4822 532 12932	Washer
32	4822 528 11244	Flywheel Assembly RV	104	4822 532 12933	Washer
33	4822 267 10756	Connector Socket 13pin			
34	4822 130 10205	Photo Sensor			
35	4822 277 11531	Mode Switch MSW-1722NCV			
39	4822 278 90613	Leaf Switch			
42	4822 358 10235	Belt BF			

Note: Only the parts mentioned in this list are normal service spare parts.



MISCELLANEOUS

1701	4822 267 10953	Flex Socket 7P Vert.
1706	4822 267 10953	Flex Socket 7P Vert.
1770	4822 267 10738	Flex Socket 13P Vert.

CAPACITORS

2621	5322 122 34123	1nF 10% 50V
2622	5322 122 34099	470pF 10% 63V
2623	5322 122 34099	470pF 10% 63V
2624	4822 126 13196	100nF 10% 25V
2625	4822 126 13196	100nF 10% 25V
2701	5322 122 33538	150pF 2% 63V
2702	5322 122 33538	150pF 2% 63V
2703	5322 122 32531	100pF 5% 50V
2704	5322 122 32531	100pF 5% 50V
2705	4822 122 33575	220pF 5% 50V
2706	4822 122 33575	220pF 5% 50V
2707	5322 122 34099	470pF 10% 63V
2708	5322 122 34099	470pF 10% 63V
2709	5322 122 31863	330pF 5% 50V
2710	5322 122 31863	330pF 5% 50V
2711	5322 122 32531	100pF 5% 50V
2712	5322 122 32531	100pF 5% 50V
2713	4822 124 41579	10µF 20% 50V
2714	4822 124 41579	10µF 20% 50V
2715	4822 124 40196	220µF 20% 16V
2716	4822 124 40196	220µF 20% 16V
2717	4822 122 33177	10nF 20% 50V
2718	4822 122 33177	10nF 20% 50V
2719	4822 126 12105	33nF 5% 63V
2720	4822 126 12105	33nF 5% 63V
2721	5322 122 31866	6,8nF 10% 63V
2722	5322 122 31866	6,8nF 10% 63V
2723	4822 126 13188	15nF 5% 63V
2724	4822 126 13188	15nF 5% 63V
2725	5322 126 10223	4,7nF 10% 63V
2726	5322 126 10223	4,7nF 10% 63V
2727	5322 122 34123	1nF 10% 50V
2728	5322 122 34123	1nF 10% 50V
2729	4822 122 32541	27nF 10% 63V
2730	4822 122 32541	27nF 10% 63V
2733	5322 122 34099	470pF 10% 63V
2734	5322 122 34099	470pF 10% 63V
2735	4822 126 13196	100nF 10% 25V
2737	4822 126 13196	100nF 10% 25V
2738	4822 126 13196	100nF 10% 25V
2741	4822 126 11585	22nF +80/-20% 25V
2742	5322 122 32654	22nF 10% 63V
2743	5322 122 32654	22nF 10% 63V
2744	4822 126 13196	100nF 10% 25V
2760	4822 126 13196	100nF 10% 25V
2761	4822 124 22263	220µF 20% 25V
2762	4822 124 40246	4,7µF 20% 63V
2763	4822 124 40433	47µF 20% 25V
2765	4822 124 40433	47µF 20% 25V
2769	5322 122 34099	470pF 10% 63V
2770	5322 122 34099	470pF 10% 63V
2780	4822 124 81151	22µF 50V
2781	4822 122 33177	10nF 20% 50V
2782	5322 126 10223	4,7nF 10% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 40242	1µF 20% 63V
2786	5322 122 32531	100pF 5% 50V
2787	4822 126 12105	33nF 5% 63V

RESISTORS

3601	4822 117 11449	2k2 1% 0,1W
3602	4822 051 20273	27k 5% 0,1W
3603	4822 117 11449	2k2 1% 0,1W
3604	4822 117 11148	56k 1% 0,1W
3605	4822 117 11449	2k2 1% 0,1W
3606	4822 051 20124	120k 5% 0,1W
3607	4822 116 52256	2k2 5% 0,5W
3608	4822 051 20273	27k 5% 0,1W
3609	4822 116 52256	2k2 5% 0,5W
3610	4822 051 20124	120k 5% 0,1W
3611	4822 116 52256	2k2 5% 0,5W
3612	4822 117 11148	56k 1% 0,1W
3613	4822 051 20273	27k 5% 0,1W
3614	4822 051 20273	27k 5% 0,1W
3616	4822 117 10833	10k 1% 0,1W
3618	4822 117 10833	10k 1% 0,1W
3620	5322 100 11542	Trimmer 4k7 30% 0,1W
3623	4822 051 20104	100k 5% 0,1W
3624	4822 051 20104	100k 5% 0,1W
3625	4822 051 10102	1k 2% 0,25W
3626	4822 051 10102	1k 2% 0,25W
3628	4822 051 20104	100k 5% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3672	4822 051 20472	4k7 5% 0,1W
3674	4822 116 52283	4k7 5% 0,5W
3676	4822 117 10834	47k 1% 0,1W
3678	4822 117 10834	47k 1% 0,1W
3679	4822 117 10834	47k 1% 0,1W
3680	4822 117 10834	47k 1% 0,1W
3685	4822 116 52234	100k 5% 0,5W
3686	4822 051 20104	100k 5% 0,1W
3701	4822 117 11503	220R 1% 0,1W
3702	4822 117 11503	220R 1% 0,1W
3703	4822 117 11503	220R 1% 0,1W
3704	4822 117 11503	220R 1% 0,1W
3705	4822 117 11503	220R 1% 0,1W
3706	4822 117 11503	220R 1% 0,1W
3707	4822 051 20101	100R 5% 0,1W
3708	4822 051 20101	100R 5% 0,1W

9-13

ELECTRICAL PARTS LIST - ETF6-FE NON-DOLBY BOARD

3709	4822 051 20688	6R8 5% 0,1W
3710	4822 051 20688	6R8 5% 0,1W
3711	4822 051 20154	150k 5% 0,1W
3712	4822 051 20154	150k 5% 0,1W
3713	4822 051 20109	10R 5% 0,1W
3714	4822 051 20109	10R 5% 0,1W
3715	4822 051 20182	1k8 5% 0,1W
3716	4822 051 20182	1k8 5% 0,1W
3717	4822 117 11449	2k2 1% 0,1W
3718	4822 117 11449	2k2 1% 0,1W
3719	4822 051 20472	4k7 5% 0,1W
3720	4822 051 20472	4k7 5% 0,1W
3721	4822 051 20562	5k6 5% 0,1W
3722	4822 051 20562	5k6 5% 0,1W
3723	4822 117 11383	12k 1% 0,1W *Autoreverse*
3723	4822 051 20153	15k 5% 0,1W *Non-Autoreverse*
3724	4822 117 11383	12k 1% 0,1W *Autoreverse*
3724	4822 051 20153	15k 5% 0,1W *Non-Autoreverse*
3725	4822 051 20109	10R 5% 0,1W
3726	4822 051 20109	10R 5% 0,1W
3727	4822 051 20562	5k6 5% 0,1W
3728	4822 051 20562	5k6 5% 0,1W
3729	4822 117 12955	2k7 1% 0,1W
3730	4822 117 12955	2k7 1% 0,1W
3731	4822 117 11507	6k8 1% 0,1W
3732	4822 117 11507	6k8 1% 0,1W
3733	4822 051 10102	1k 2% 0,25W
3734	4822 051 10102	1k 2% 0,25W
3735	4822 051 20223	22k 5% 0,1W
3736	4822 051 20223	22k 5% 0,1W
3741	4822 117 11449	2k2 1% 0,1W
3742	4822 117 11449	2k2 1% 0,1W
3743	4822 051 20122	1k2 5% 0,1W *Autoreverse*
3743	4822 051 10102	1k2% 0,25W *Non-Autoreverse*
3744	4822 051 20122	1k2 5% 0,1W *Autoreverse*
3744	4822 051 10102	1k2% 0,25W *Non-Autoreverse*
3745	4822 051 20332	3k3 5% 0,1W
3746	4822 051 20332	3k3 5% 0,1W
3748	4822 117 11449	2k2 1% 0,1W
3749	4822 117 10834	47k 1% 0,1W
3751	4822 117 10833	10k 1% 0,1W
3752	4822 051 20104	100k 5% 0,1W
3753	4822 051 20104	100k 5% 0,1W
3754	4822 051 20105	1M 5% 0,1W
3755	4822 051 20105	1M 5% 0,1W
3756	4822 117 13579	220k 1% 0,1W
3757	4822 117 13579	220k 1% 0,1W
3758	4822 117 10833	10k 1% 0,1W
3759	4822 117 10833	10k 1% 0,1W
3760	4822 051 20121	120R 5% 0,1W
3761	4822 116 83864	10k 5% 0,5W
3762	4822 117 11454	820R 1% 0,1W
3763	4822 051 20154	150k 5% 0,1W
3764	4822 116 83872	220R 5% 0,5W
3765	4822 051 20393	39k 5% 0,1W
3766	4822 051 20475	4M7 5% 0,1W
3767	4822 051 20475	4M7 5% 0,1W
3768	4822 117 10833	10k 1% 0,1W
3769	4822 117 11383	12k 1% 0,1W *Autoreverse*
3769	4822 051 20822	8k2 5% 0,1W *Non-Autoreverse*
3770	4822 117 11139	1k5 1% 0,1W
3771	4822 051 20122	1k2 5% 0,1W
3772	4822 051 20472	4k7 5% 0,1W *Autoreverse*
3772	4822 051 20562	5k6 5% 0,1W *Non-Autoreverse*
3773	5322 100 11542	Trimmer 4k7 30% 0,1W
3774	4822 117 10833	10k 1% 0,1W *Autoreverse*
3774	4822 051 20822	8k2 5% 0,1W *Non-Autoreverse*
3775	4822 051 20478	4R7 5% 0,1W
3776	4822 117 11507	6k8 1% 0,1W
3777	4822 117 10353	150R 1% 0,1W
3778	4822 052 10688 ⚠	6R8 5% 0,33W
3779	4822 051 20334	330k 5% 0,1W
3780	4822 051 20105	1M 5% 0,1W
3781	4822 051 20475	4M7 5% 0,1W
3784	4822 051 10102	1k 2% 0,25W
3786	4822 051 20223	22k 5% 0,1W
3787	4822 051 20105	1M 5% 0,1W
3788	4822 051 20105	1M 5% 0,1W
3789	4822 117 10834	47k 1% 0,1W
4701	4822 051 20008	0R Jumper 0805
4702	4822 051 20008	0R Jumper 0805
4703	4822 051 20008	0R Jumper 0805
4704	4822 051 20008	0R Jumper 0805
4705	4822 051 20008	0R Jumper 0805
4706	4822 051 20008	0R Jumper 0805
4707	4822 051 20008	0R Jumper 0805
4708	4822 051 20008	0R Jumper 0805
4709	4822 051 20008	0R Jumper 0805
4710	4822 051 20008	0R Jumper 0805
4711	4822 051 20008	0R Jumper 0805
4712	4822 051 20008	0R Jumper 0805
4713	4822 051 20008	0R Jumper 0805
4714	4822 051 20008	0R Jumper 0805
4715	4822 051 20008	0R Jumper 0805
4716	4822 051 20008	0R Jumper 0805
4717	4822 051 20008	0R Jumper 0805
4718	4822 051 20008	0R Jumper 0805
4719	4822 051 20008	0R Jumper 0805
4720	4822 051 20008	0R Jumper 0805
4721	4822 051 20008	0R Jumper 0805
4722	4822 051 20008	0R Jumper 0805
4723	4822 051 20008	0R Jumper 0805
4724	4822 051 20008	0R Jumper 0805
4725	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - ETF6-FE NON-DOLBY BOARD

RESISTORS

4726	4822 051 20008	0R Jumper 0805
4727	4822 051 20008	0R Jumper 0805
4728	4822 051 20008	0R Jumper 0805
4729	4822 051 20008	0R Jumper 0805
4730	4822 051 20008	0R Jumper 0805
4731	4822 051 20008	0R Jumper 0805
4732	4822 051 20008	0R Jumper 0805
4733	4822 051 20008	0R Jumper 0805
4734	4822 051 20008	0R Jumper 0805
4735	4822 051 20008	0R Jumper 0805
4736	4822 051 20008	0R Jumper 0805
4737	4822 051 20008	0R Jumper 0805
4738	4822 051 20008	0R Jumper 0805
4739	4822 051 20008	0R Jumper 0805
4740	4822 051 20008	0R Jumper 0805
4741	4822 051 20008	0R Jumper 0805
4742	4822 051 20008	0R Jumper 0805
4781	4822 051 20681	680R 5% 0,1W
4785	4822 051 20008	0R Jumper 0805
4790	4822 051 20008	0R Jumper 0805
4794	4822 051 20008	0R Jumper 0805
4795	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5701	4822 157 11477	Coil 2,2µH 5%
5703	4822 156 20946	Oscillator Coil 100kHz

DIODES

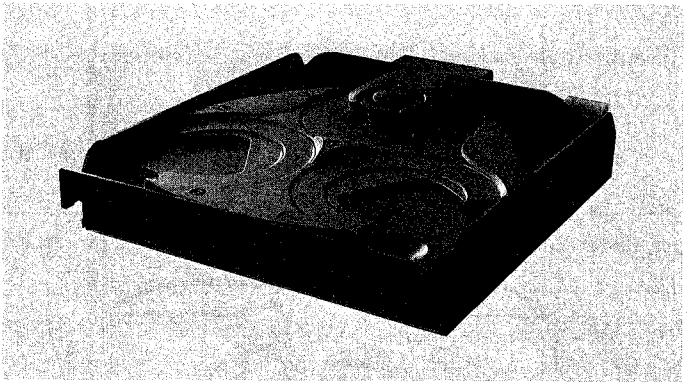
6611	4822 130 31878	1N4003G
6612	4822 130 31878	1N4003G
6614	4822 130 30621	1N4148
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-B8V2
6778	4822 130 30621	1N4148
6782	4822 130 30621	1N4148
6785	4822 130 30621	1N4148
6786	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7610	5322 209 11306	HEF4094BT
7612	5322 130 60845	BC807-25
7613	5322 130 60845	BC807-25
7614	5322 130 60845	BC807-25
7616	5322 130 60508	BC857B
7618	4822 130 60511	BC847B
7619	4822 130 60511	BC847B
7620	4822 130 60511	BC847B
7622	4822 130 60511	BC847B
7623	4822 130 60511	BC847B
7624	4822 130 60511	BC847B
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7780	4822 130 60511	BC847B
7781	4822 130 42804	BC817-25
7782	4822 130 44568	BC557B
7783	4822 130 60511	BC847B
7784	5322 130 60508	BC857B
7786	4822 130 63494	J111
7787	4822 130 60511	BC847B
7791	4822 130 60511	BC847B
7792	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service spare parts.

9-14



3CDC 99 Module

(3 Disc Carrousel Changer)

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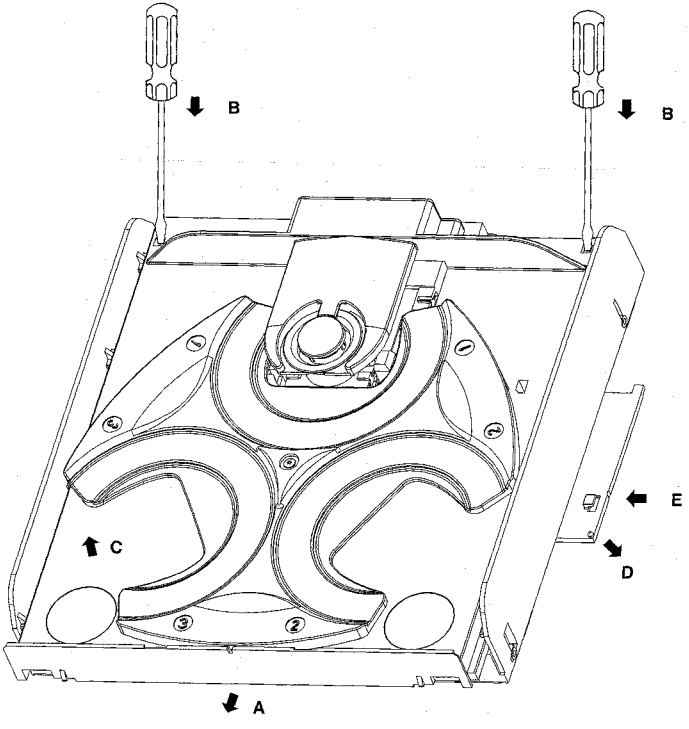
Demounting Hints



Demounting of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Demounting of Flex Plate

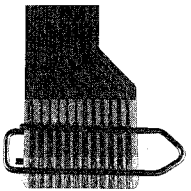
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

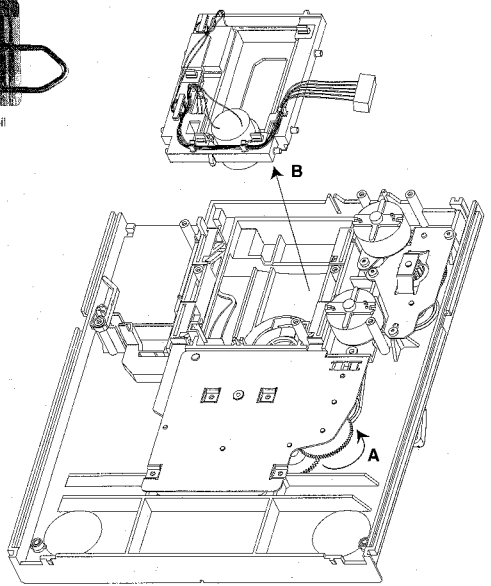
Replacement of CD Drive

See also exploded view of changer mechanism.

1. Demount printed circuit board: remove 5 screws.
2. Disconnect flexfoil and JST connector of CD drive from Printed circuit board. Shortcircuit the flexfoil with a paperclip to protect the laser against ESD.
3. Remove 2 screws (pos 107,108) and demount CD drive lockings (pos 105,106).
4. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
5. Demount CD drive support (pos 95) Ⓑ.
6. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.



CD drive flex foil

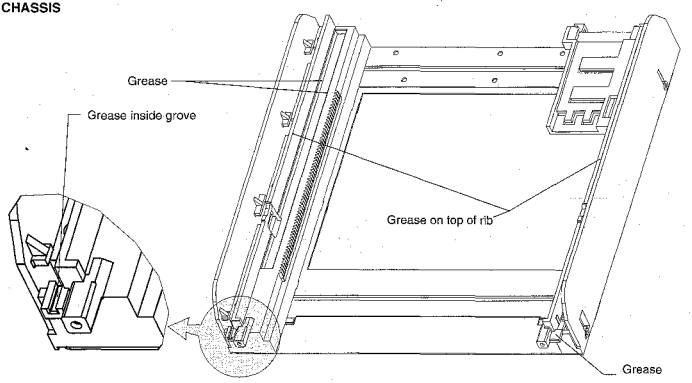


Mounting of Carrousel

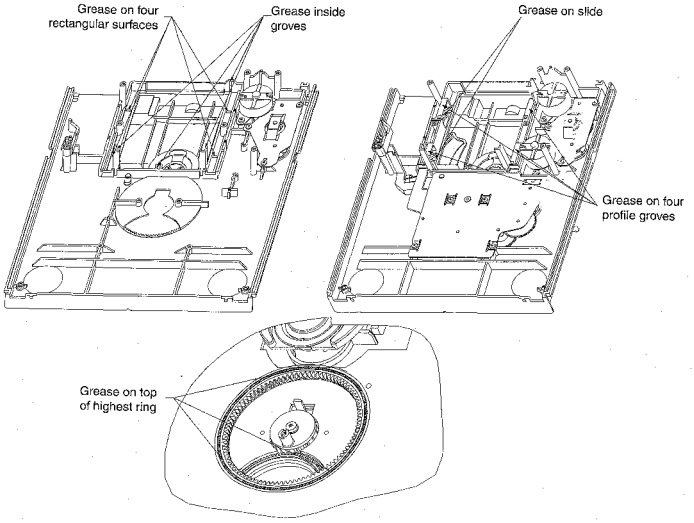
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carrousel (pos 115) so that disc is positioned right on turntable. Carrousel position number doesn't matter.

Lubrication Instructions

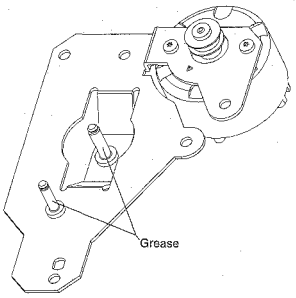
CHASSIS



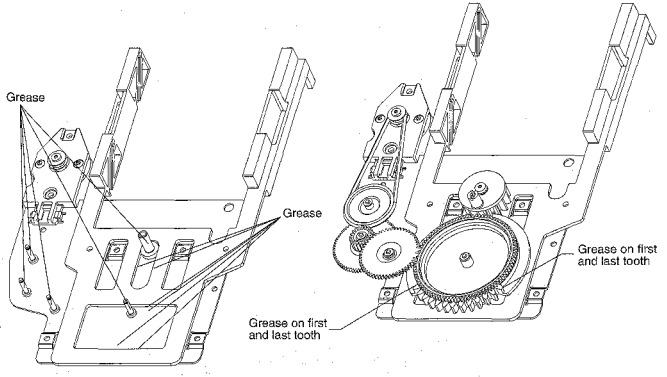
DRAWER


Grease on four rectangular surfaces
Grease inside groves
Grease on slide
Grease on four profile groves
Grease on top of highest ring

DRAWER MECHANISM



DISC CHANGE MECHANISM



Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
• SWITCH OFF POWER SUPPLY
• ESD PROTECTION
ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:

1. Disconnect old CD drive flexfoil from printed board
2. Connect paperclip to CD drive flexfoil to short-circuit flexfoil (fig.1)
3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CD drive mechanism
5. Position new CD mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CD drive
8. Connect new flexfoil to print connector (fig.3)

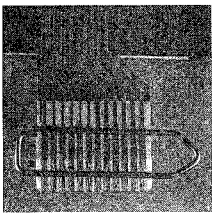


fig.1

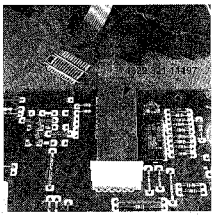


fig.2

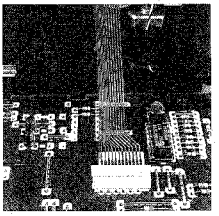
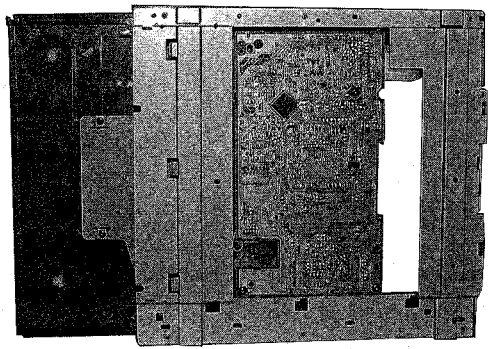
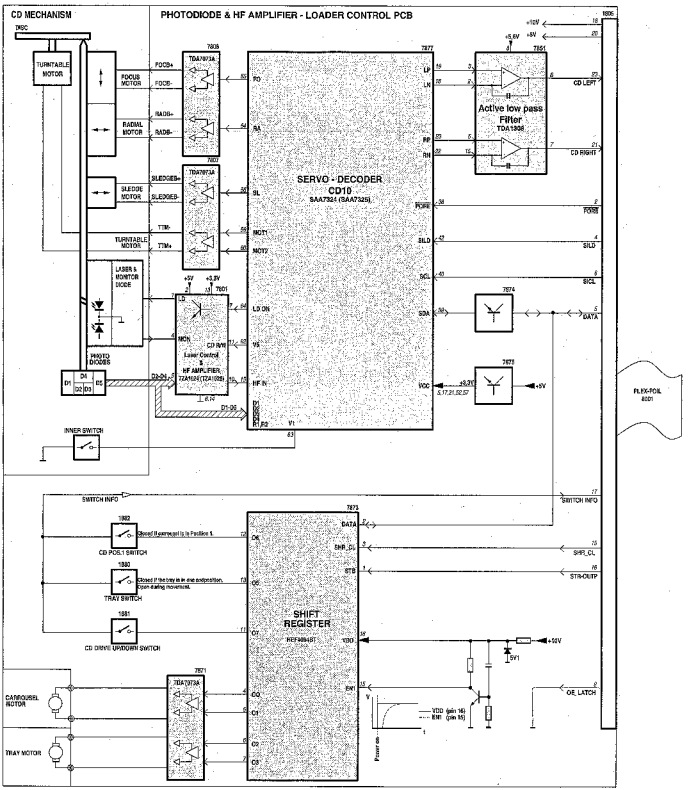


fig.3

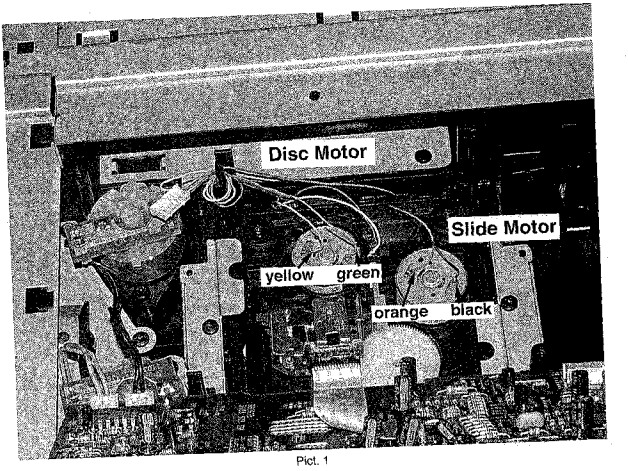
Service Position



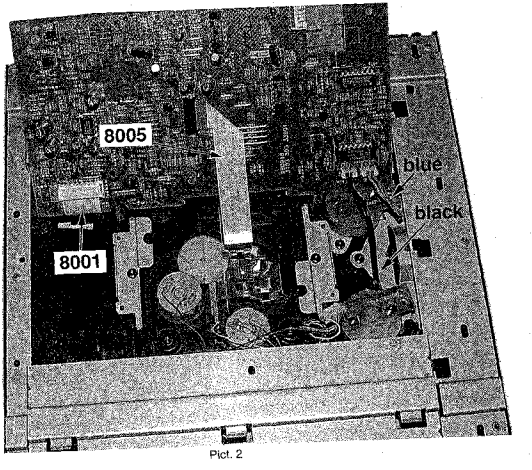
Blockdiagram



Wiring of CD Drive



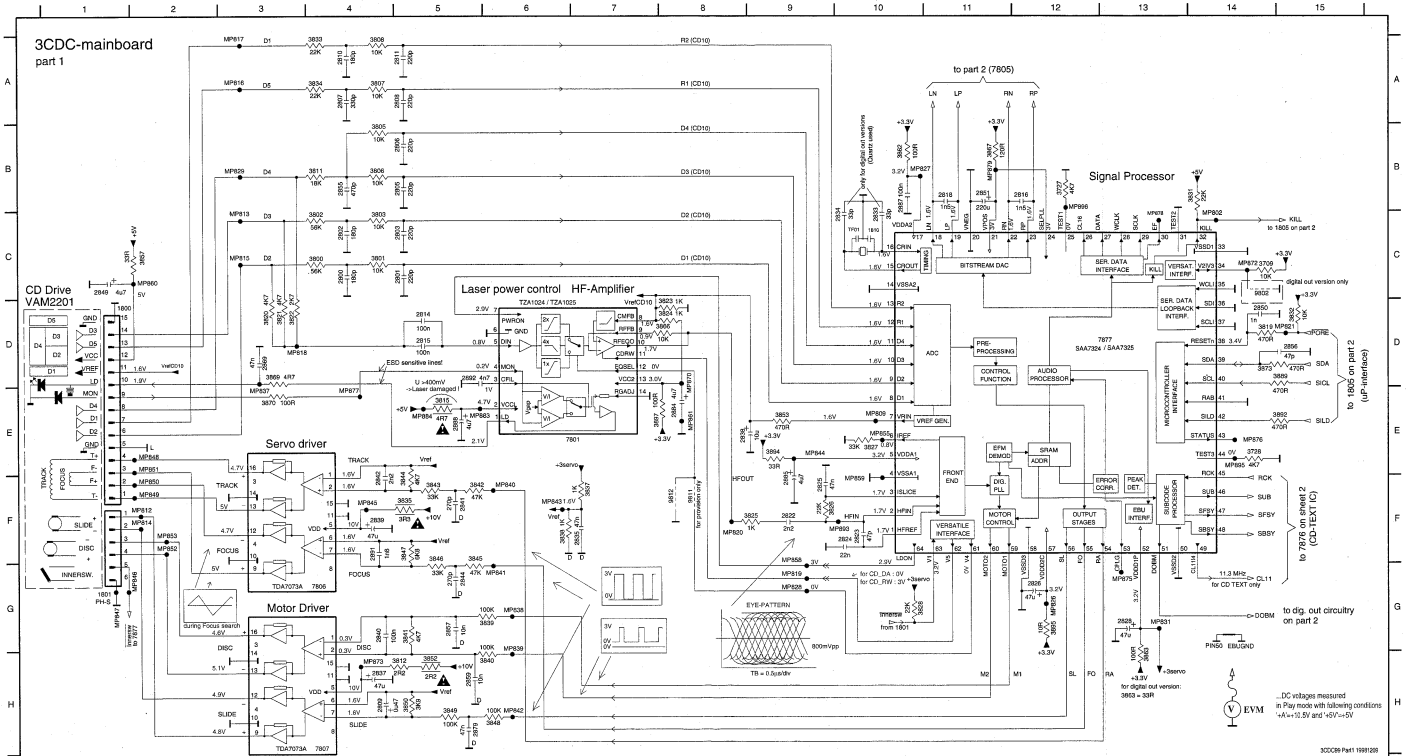
Pict. 1



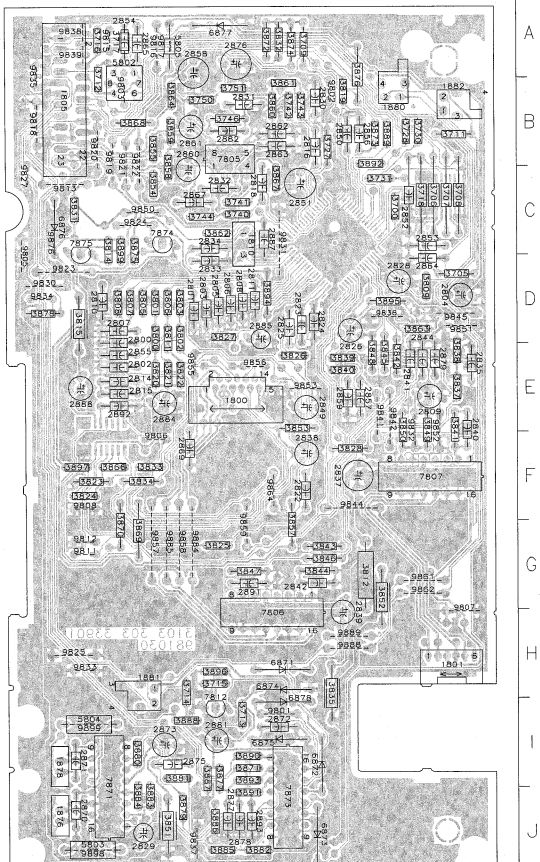
Pict. 2

10-9

1800 D2	2805 B5	2814 D5	2825 F9	2838 E8	2850 D14	2879 H5	2892 D5	3803 C4	3815 E5	3825 F9	3834 A4	3842 F5	3849 H5	3866 D8	3894 E9	9802 C14
1801 G1	2806 B5	2815 D5	2826 G12	2839 F4	2851 B11	2880 D8	3709 C14	3805 B4	3819 D14	3826 F9	3835 F5	3843 F5	3850 H5	3867 B11	3895 G12	9811 F8
1810 C10	2807 A4	2816 B12	2828 G13	2840 G4	2855 B4	2884 E8	3727 B12	3806 B4	3820 D3	3827 E10	3837 F7	3844 F5	3852 H5	3869 D3	3897 E7	9812 F8
2800 C4	2808 A5	2818 B11	2833 C10	2841 F5	2856 D15	2885 F9	3728 E14	3807 A4	3821 D3	3828 G10	3838 F6	3845 F5	3853 E9	3870 E3	7801 E7	
2801 C5	2809 H4	2822 F9	2834 C10	2842 F4	2857 G5	2887 B10	3800 C4	3808 A4	3822 D3	3831 B14	3839 G6	3846 F5	3857 C2	3873 D14	7806 G4	
2802 C4	2810 A4	2823 F10	2835 F7	2844 G5	2859 H5	2888 E5	3801 C4	3811 B4	3823 D8	3832 D15	3840 H6	3847 F5	3862 B10	3889 D15	7807 H4	
2803 C5	2811 A5	2824 F10	2837 H4	2849 C1	2869 D3	2891 F4	3802 C4	3812 H5	3824 D8	3833 A4	3841 G5	3848 H6	3863 H13	3892 E15	7877 D12	



3CDC99 Board Componentside view



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Transistor pinning

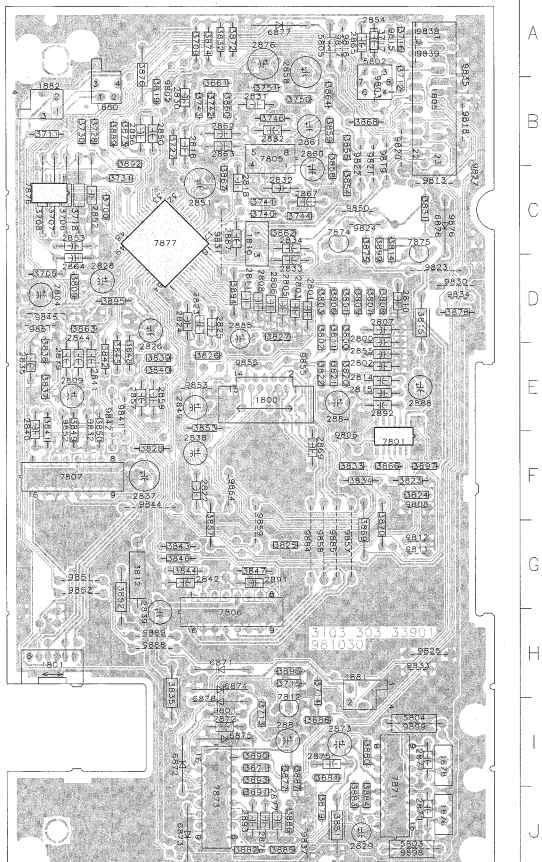
3CDC99 Layout stage : 1 981030

Mapping

1800	E3	3716	A2	3889	B5
1801	H5	3717	A2	3890	I3
1805	B1	3718	C5	3891	J3
1810	C3	3727	B4	3892	B5
1876	J1	3728	B5	3893	I3
1878	I1	3730	B5	3894	D3
1880	B5	3731	C5	3895	D5
1881	H2	3740	C3	3896	H3
1882	B5	3741	C3	3897	F1
2800	D2	3742	B4	3899	C2
2801	D3	3743	B4	5802	A2
2802	E2	3744	C3	5803	J1
2803	D3	3746	B3	5804	I1
2804	D5	3750	B3	5805	A2
2805	D3	3751	B3	6871	H4
2806	D3	3800	D2	6872	I4
2807	D2	3801	D2	6873	J4
2808	D3	3802	D2	6874	H3
2809	E5	3803	D2	6875	I3
2810	D2	3805	D2	6876	C1
2811	D3	3806	D2	6877	A3
2814	E2	3807	D2	6878	H4
2815	E2	3808	D2	7801	F1
2816	B4	3809	D5	7805	B3
2818	C3	3811	D2	7806	H3
2822	F4	3812	G5	7807	F5
2823	D4	3814	C2	7812	H3
2824	D4	3815	D1	7871	J2
2825	D4	3819	B4	7873	J4
2826	E4	3820	E2	7874	C2
2828	D5	3821	E2	7875	C1
2829	J2	3822	E2	7876	C5
2830	B4	3823	F1	7877	C4
2831	B3	3824	F1	9801	I4
2832	C3	3825	G3	9802	B4
2833	D3	3826	E4	9803	B2
2834	C3	3827	D3	9805	D1
2835	E5	3828	F4	9806	F2
2837	F4	3831	C1	9807	G5
2838	F4	3832	A4	9808	F1
2839	H4	3833	F2	9811	G1
2840	E5	3834	F2	9812	G1
2841	E5	3835	H4	9813	C1
2842	G4	3837	E5	9815	A2
2844	D5	3838	E5	9816	A2
2849	E4	3839	E4	9817	A2
2850	B4	3840	E4	9818	B1
2851	C4	3841	E5	9819	B2
2852	C5	3842	E5	9820	B2
2853	C5	3843	G4	9821	B2
2854	A2	3844	G4	9822	B2
2855	E2	3845	E5	9823	D1
2856	B5	3846	G4	9824	C2
2857	E5	3847	G3	9825	H1
2858	A3	3848	E5	9827	C1
2859	E4	3849	E5	9830	D1
2860	B3	3850	E5	9831	C4
2861	B3	3851	J2	9832	E5
2862	B4	3852	G5	9833	H1
2863	B4	3853	E4	9834	D1
2864	D5	3854	C2	9835	A1
2865	A2	3855	B2	9836	D5
2867	C3	3857	G4	9837	J3
2869	F2	3858	C2	9838	A1
2870	J1	3859	B2	9839	A1
2871	I1	3860	B4	9841	E5
2872	I4	3861	B4	9842	E5
2873	I2	3862	C3	9844	F4
2875	I3	3863	D5	9845	D5
2876	A3	3864	B2	9850	C2
2877	J3	3866	F2	9851	D5
2878	J3	3867	C4	9852	E5
2879	E5	3868	B2	9853	E4
2881	I3	3869	G2	9855	E3
2882	B3	3870	G2	9856	E3
2884	E2	3871	I3	9857	G2
2885	D3	3872	A3	9858	G2
2887	C4	3873	B5	9859	G3
2888	E1	3874	A4	9861	G5
2891	G3	3875	C2	9862	G5
2892	E2	3876	A4	9864	F3
2893	J3	3877	I3	9876	C1
3700	C5	3878	D1	9884	G3
3705	D5	3879	J2	9885	G2
3706	C5	3880	I2	9888	H4
3707	C5	3881	I2	9889	H4
3708	C5	3882	J3	9898	J1
3709	A4	3883	J2	9899	I1
3711	B5	3884	J2		
3712	B2	3885	J3		
3713	I3	3886	J3		
3714	H3	3887	I3		
3715	H3	3888	I3		

10-10

3CDC99 Board Copperside view



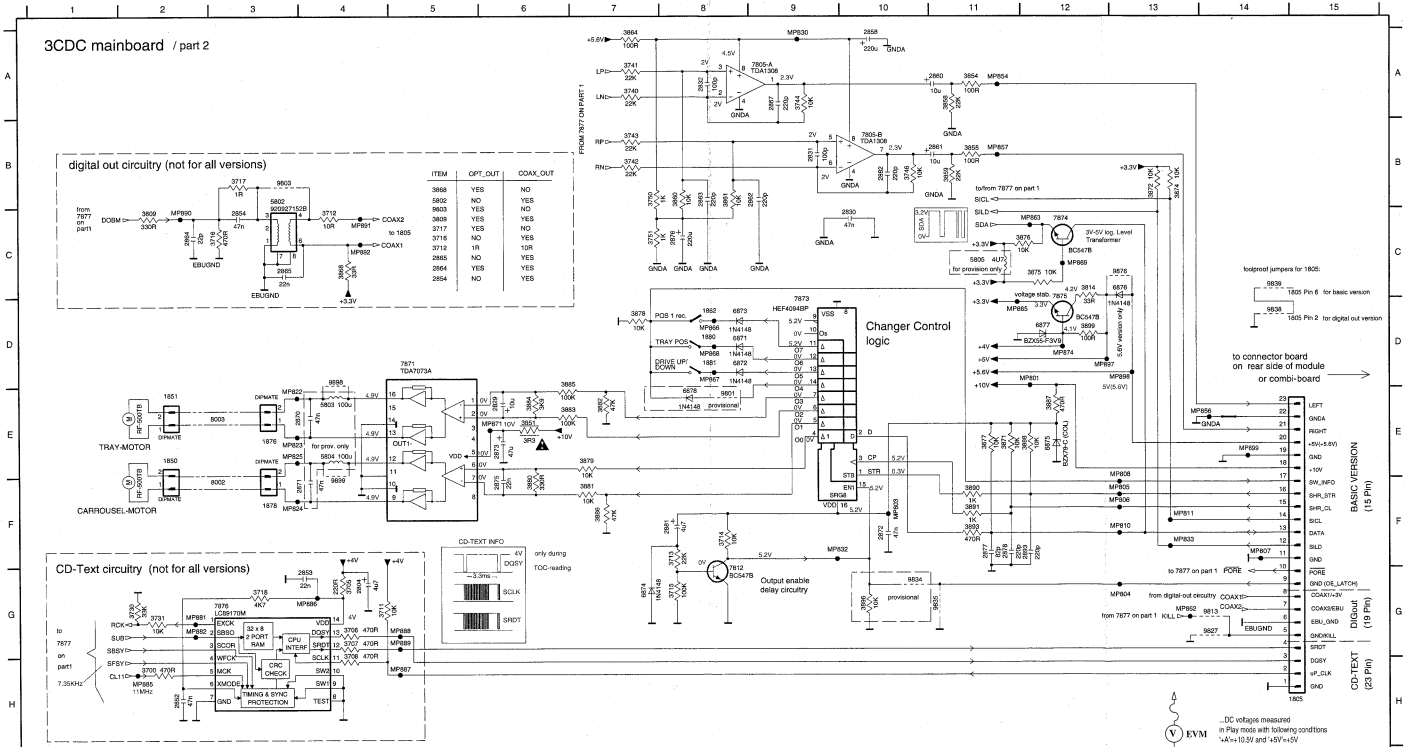
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Transistor pinning

3CDC99 Layout stage : 1 981030

10-11

1805 H14	2804 G4	2853 G4	2863 B8	2872 F10	2881 F8	3707 G4	3715 G8	3740 A7	3750 B7	3855 B11	3868 C4	3877 E11	3883 E6	3890 F11	5803 E4	6874 G7	7805-B B10	7876 G3	9835 G11
1876 E3	2829 E6	2854 C3	2864 C2	2873 E6	2882 B10	3708 H4	3716 C3	3741 A7	3751 C7	3858 A11	3871 E11	3878 D7	3884 E6	3891 F11	5804 E4	6875 E12	7812 G8	9801 E8	9838 D14
1878 F3	2830 C10	2858 A10	2865 C3	2875 F6	2893 F12	3711 G4	3717 B3	3742 B7	3809 C2	3859 B11	3872 B13	3879 E7	3885 D6	3893 F11	5805 C11	6876 C13	7871 D5	9803 B3	9839 C14
1880 D8	2831 B9	2860 A11	2867 A9	2876 C8	3700 H2	3712 C4	3718 G3	3743 B7	3814 C12	3860 B8	3874 B13	3880 F6	3886 F7	3896 G10	6871 D8	6877 D12	7873 D9	9813 G14	9876 C13
1881 D8	2832 A8	2861 B11	2870 E3	2877 F11	3705 G4	3713 F8	3730 G2	3744 A9	3851 E6	3861 B8	3875 C12	3881 F7	3887 E12	3899 D12	6872 D8	6878 E8	7874 C12	9827 G14	9898 D4
1882 D8	2852 H2	2862 B8	2871 F4	2878 F11	3706 G4	3714 F8	3731 G2	3746 B10	3854 A11	3864 A7	3876 C12	3882 E7	3888 E12	5802 B3	6873 D8	7805-A A9	7875 D12	9834 G10	9899 E4



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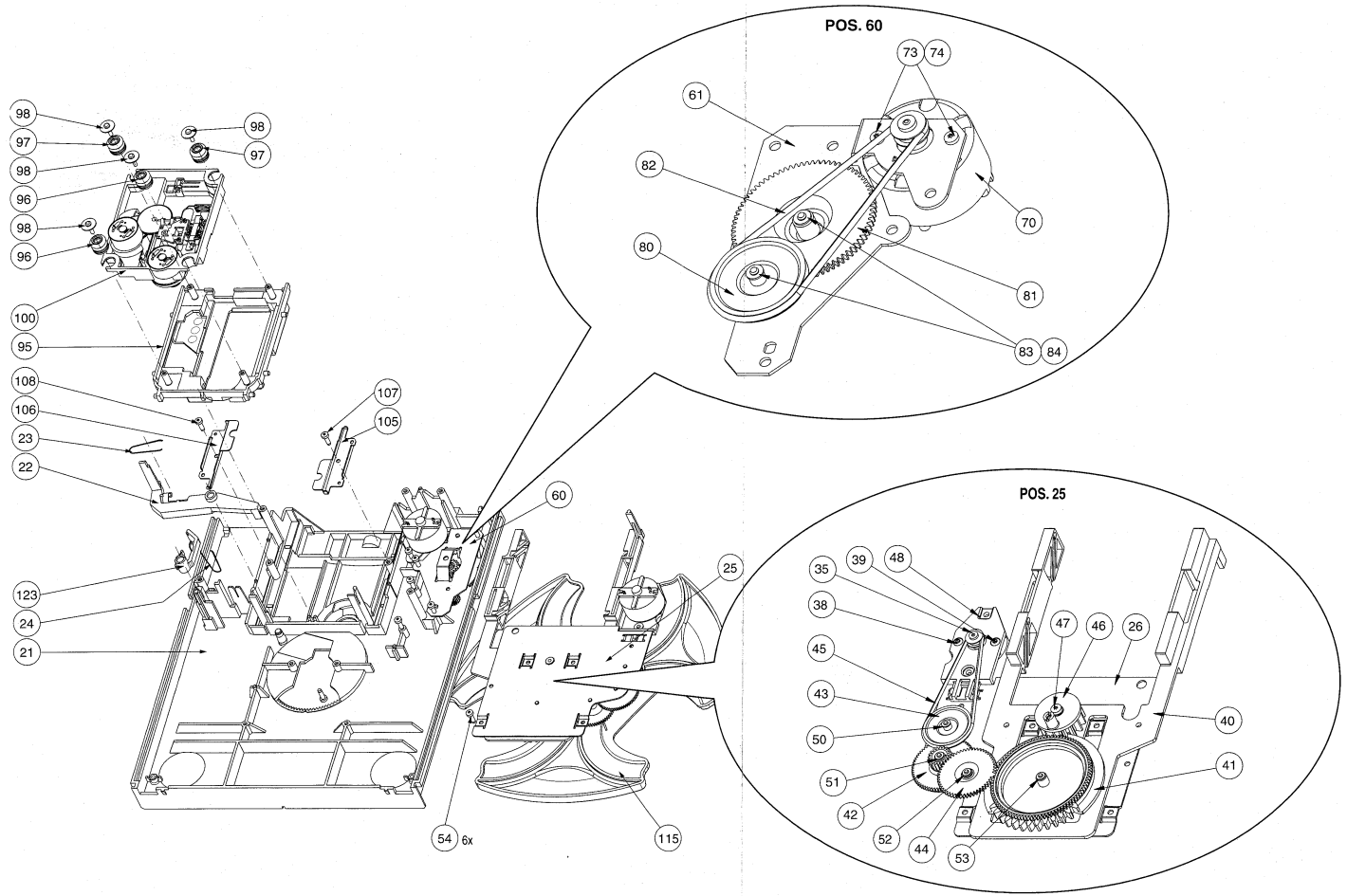
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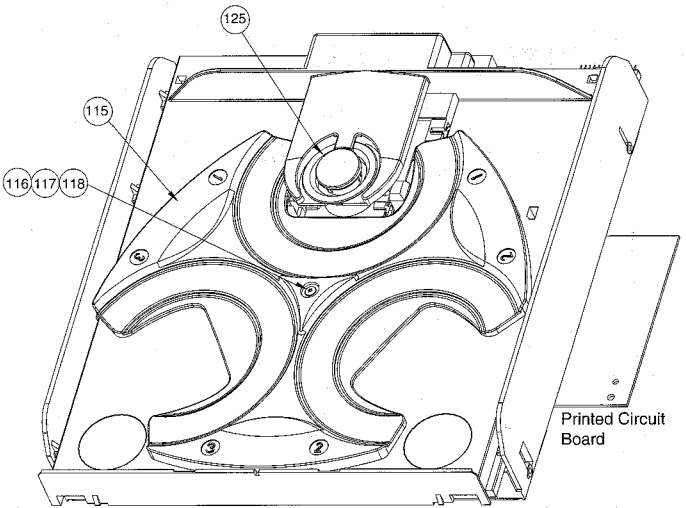

MECHANICAL PARTSLIST 3CDC-99 MODULE

	4822 390 10136	POLYLUB GLY801 (GREASE)
3	4822 463 11008	GUIDE LEFT
4	4822 463 11009	GUIDE RIGHT
21	4822 441 11615	DRAWER
22	4822 402 10088	BRACKET TUMBLER
36	4822 502 12548	SCREW M2,6X3,5
39	4822 502 12548	SCREW M2,6X3,5
40	4822 463 11011	SLIDE
41	4822 522 10506	CONTROL DISC
42	4822 522 10492	GEAR WHEEL
43	4822 526 10937	PULLEY
44	4822 522 10493	IDLER WHEEL
45	4822 358 10115	BELT
46	4822 466 10735	ECCENTRIC GEAR WHEEL
50	4822 532 12364	WASHER
51	4822 532 12364	WASHER
52	4822 532 12364	WASHER
53	4822 532 12364	WASHER
35	4822 361 10753	CARROUSEL MOTOR
70	4822 361 10753	CARROUSEL MOTOR

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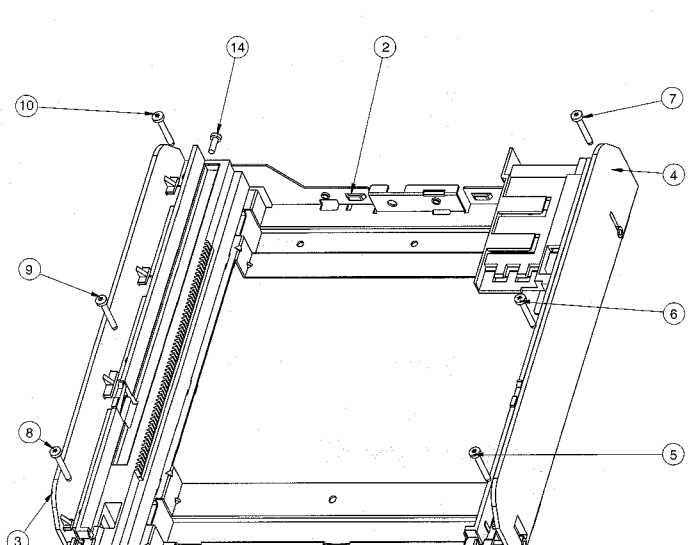

MECHANICAL PARTSLIST 3CDC-99 MODULE

73	4822 502 12548	SCREW M2,6X3,5
74	4822 502 12548	SCREW M2,6X3,5
80	4822 526 10937	PULLEY
81	4822 522 10494	GEAR DRAWER
82	4822 358 10115	BELT
83	4822 532 12364	WASHER
84	4822 532 12364	WASHER
95	4822 404 10895	SUPPORT
96	4822 526 10431	SUSPENSION
97	4822 526 10431	SUSPENSION
100	4822 691 10772	CD DRIVE VAM2201
115	4822 466 10736	CARROUSEL
117	4822 532 12365	BUSH DRAWER
123	4822 402 11237	SWITCH BRACKET
125	4822 401 11708	DISC CLAMP

ELECTRICAL PARTSLIST 3CDC-99 MODULE

MISCELLANEOUS

1800	4822 265 10925	FLEX FOIL CONNECTOR 15PIN	
1805	4822 265 11533	FLEX FOIL CONNECTOR 23PIN	
1805	2422 025 09768	FLEX FOIL CONNECTOR 19PIN	
1805	4822 267 51322	FLEX FOIL CONNECTOR 15PIN	
1880	4822 276 13503	SWITCH	
1881	4822 276 13503	SWITCH	
1882	4822 276 13503	SWITCH	
8001	4822 320 12659	FLEX FOIL 23PIN 480MM *	
8001	4822 320 12729	FLEX FOIL 23PIN 400MM	
8001	4822 320 12658	FLEX FOIL 19PIN 480MM	
8001	4822 320 12232	FLEX FOIL 15PIN 480MM	
8005	3103 308 91820	FLEX FOIL 15PIN 95MM	

* will be replaced by shorter length (400mm) when stock is out.

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 124 40246	4,7µF	20%	63V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12767	330pF	10%	50V
2808	4822 122 10466	220pF	10%	50V
2809	5322 124 41948	0,47µF	20%	50V
2810	4822 126 10053	180pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2814	4822 126 12785	47nF	20%	50V
2815	4822 126 12882	100nF	20%	50V
2816	4822 126 12878	1,5nF	10%	16V
2818	4822 126 12878	1,5nF	10%	16V
2822	4822 126 12339	2,2nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 11585	22nF	20%	50V
2825	4822 126 12785	47nF	20%	50V
2826	4822 124 80231	47µF	20%	16V
2828	4822 124 40433	47µF	20%	25V
2829	4822 124 21732	10µF	20%	25V
2830	4822 126 12785	47nF	20%	50V
2831	4822 122 33195	100pF	10%	50V
2832	4822 122 33195	100pF	10%	50V
2833	4822 122 33069	33pF	5%	50V
2834	4822 122 33069	33pF	5%	50V
2835	4822 126 12785	47nF	20%	50V
2837	4822 124 40433	47µF	20%	25V
2838	4822 124 41579	10µF	20%	50V
2839	4822 124 40433	47µF	20%	25V
2840	4822 126 12882	100nF	20%	50V
2841	4822 126 12702	270pF	10%	50V
2842	4822 126 12339	2,2nF	10%	16V
2844	4822 126 12702	270pF	10%	50V
2849	4822 124 40246	4,7µF	20%	63V
2850	4822 122 33197	1nF	10%	50V
2851	4822 124 40196	220µF	20%	16V
2852	4822 126 12785	47nF	20%	50V
2853	4822 126 11585	22nF	20%	50V
2854	4822 126 12785	47nF	20%	50V
2855	4822 122 33519	470pF	10%	50V
2856	4822 122 33848	47pF	5%	50V
2857	4822 121 51387	10nF	20%	16V
2858	4822 124 40196	220µF	20%	16V
2859	4822 121 51387	10nF	20%	16V
2860	4822 124 41579	10µF	20%	50V
2861	4822 124 41579	10µF	20%	50V

CAPACITORS

2862	4822 122 10466	220pF	10%	50V
2863	4822 122 10466	220pF	10%	50V
2864	4822 122 33191	22pF	5%	50V
2865	4822 126 11585	22nF	20%	50V
2867	4822 122 10466	220pF	10%	50V
2869	4822 126 12785	47nF	20%	50V
2872	4822 126 12785	47nF	20%	50V
2873	4822 124 12233	47µF	20%	25V
2875	4822 126 11585	22nF	20%	50V
2876	4822 124 40196	220µF	20%	16V
2877	4822 122 10319	82pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 126 12785	47nF	20%	50V
2882	4822 122 10466	220pF	10%	50V
2884	4822 124 40246	4,7µF	20%	63V
2885	4822 124 40246	4,7µF	20%	63V
2887	4822 126 12882	100nF	20%	50V
2888	4822 124 40246	4,7µF	20%	63V
2891	4822 122 10576	1,8nF	10%	16V
2892	4822 126 11714	4,7nF	20%	16V
2893	4822 122 10466	220pF	10%	50V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83863	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3709	4822 116 83864	10kΩ	5%	0,5W
3711	4822 116 83864	10kΩ	5%	0,5W
3712	4822 116 52176	10Ω	5%	0,5W
3713	4822 116 52257	22kΩ	5%	0,5W
3714	4822 116 83864	10kΩ	5%	0,5W
3715	4822 116 52234	100kΩ	5%	0,5W
3716	4822 116 83883	470Ω	5%	0,16W
3718	4822 116 52283	4,7kΩ	5%	0,5W
3727	4822 116 52283	4,7kΩ	5%	0,5W
3728	4822 116 52283	4,7kΩ	5%	0,5W
3730	4822 116 52271	33kΩ	5%	0,16W
3731	4822 116 83864	10kΩ	5%	0,5W
3740	4822 116 52257	22kΩ	5%	0,5W
3741	4822 116 52257	22kΩ	5%	0,5W
3742	4822 116 52257	22kΩ	5%	0,5W
3743	4822 116 52257	22kΩ	5%	0,5W
3744	4822 116 83864	10kΩ	5%	0,5W
3746	4822 116 83864	10kΩ	5%	0,5W
3750	4822 050 11002	1kΩ	5%	0,2W
3751	4822 050 11002	1kΩ	5%	0,2W
3800	4822 116 52291	56kΩ	5%	0,5W
3801	4822 116 83864	10kΩ	5%	0,5W
3802	4822 116 52291	56kΩ	5%	0,5W
3803	4822 116 83864	10kΩ	5%	0,5W
3805	4822 116 83864	10kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 83864	10kΩ	5%	0,5W
3809	4822 116 83876	270Ω	5%	0,16W
3811	4822 116 52251	18kΩ	5%	0,5W
3812	4822 053 10228	2,2Ω	5%	1W
3814	4822 116 52191	33Ω	5%	0,5W
3815	4822 052 10478	4,7Ω	5%	NFR
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52283	4,7kΩ	5%	0,5W
3821	4822 116 52283	4,7kΩ	5%	0,5W

ELECTRICAL PARTSLIST 3CDC-99 MODULE

RESISTORS

3822	4822 116 52249	1,8kΩ	5%	0,16W
3823	4822 050 11002	1kΩ	5%	0,2W
3824	4822 050 11002	1kΩ	5%	0,2W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 116 52271	33kΩ	5%	0,16W
3828	4822 116 52257	22kΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 116 83864	10kΩ	5%	0,5W
3833	4822 116 52257	22kΩ	5%	0,5W
3834	4822 116 52257	22kΩ	5%	0,5W
3835	4822 052 10338	3,3Ω		NFR25
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52234	100kΩ	5%	0,5W
3840	4822 116 52234	100kΩ	5%	0,5W
3841	4822 116 52283	4,7kΩ	5%	0,5W
3842	4822 116 83884	47kΩ	5%	0,16W
3843	4822 116 52271	33kΩ	5%	0,16W
3844	4822 116 52283	4,7kΩ	5%	0,5W
3845	4822 116 83884	47kΩ	5%	0,16W
3846	4822 116 52271	33kΩ	5%	0,16W
3847	4822 116 83961	6,8kΩ	5%	0,16W
3848	4822 116 52234	100kΩ	5%	0,5W
3849	4822 116 52234	100kΩ	5%	0,5W
3850	4822 116 52276	3,9kΩ	5%	0,5W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10228	2,2Ω	5%	0,33W
3853	4822 116 83883	470Ω	5%	0,16W
3854	4822 116 52175	100Ω	5%	0,5W
3855	4822 116 52175	100Ω	5%	0,5W
3857	4822 116 52191	33Ω	5%	0,5W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3860	4822 116 83864	10kΩ	5%	0,5W
3861	4822 116 83864	10kΩ	5%	0,5W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52191	33Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3866	4822 116 83864	10kΩ	5%	0,5W
3867	4822 116 83868	150Ω	5%	0,5W
3869	4822 050 24708	4,7Ω	1%	0,6W
3870	4822 116 52175	100Ω	5%	0,5W
3871	4822 116 83864	10kΩ	5%	0,5W
3872	4822 116 83864	10kΩ	5%	0,5W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 116 83864	10kΩ	5%	0,5W
3875	4822 116 83864	10kΩ	5%	0,5W
3876	4822 116 83864	10kΩ	5%	0,5W
3877	4822 116 83864	10kΩ	5%	0,5W
3878	4822 116 83864	10kΩ	5%	0,5W
3879	4822 116 83864	10kΩ	5%	0,5W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 116 83864	10kΩ	5%	0,5W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 116 83883	470Ω	5%	0,16W
3888	4822 116 83864	10kΩ	5%	0,5W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W

RESISTORS

3892	4822 116 83883	470Ω	5%	0,16W
3893	4822 116 83883	470Ω	5%	0,16W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3897	4822 116 52175	100Ω	5%	0,5W
3899	4822 116 52175	100Ω	5%	0,5W

COILS

1810	4822 242 10849	QUARTZ 8,46MHz
1810	4822 242 73557	CERAMIC RES. 8,46MHz
5802	4822 156 31056	FILTER DIGITAL OUT

DIODES

6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-B5V1
6877	4822 130 31981	BZX79-C3V9

TRANSISTORS

7812	4822 130 40959	BC547B
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7801 ©	4822 209 17286	TZA1024T/N1 HF-AMPLIFIER
7805	4822 209 17264	TDA1308 OPAMP
7806	4822 209 32852	TDA7073A/N2 SERVO DRIVER
7807	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7871	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7873	5322 209 10421	HEF4094BP SHIFT REGISTER
7876 ©	4822 209 16143	LC89170M CD TEXT
7877 ©	4822 209 17285	SAA7324H/M1 SIGNAL PROCESSOR

COMBI BOARD

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Brief introduction of the Combi Board

NOTES

A. TRANSFORMER PRIMARY PART

Transformer Primary Circuit provide connection for AC mains supply and primary wires of transformer.

B. POWER SUPPLY PART

Power Supply Circuit consists of rectifiers, capacitive filters and voltage regulators. Regulated voltage include +5V6, +12A, +12M, -26V, PWDN. The +C supply to the power amplifier is not regulated. F1-F2 is the ac supply voltage to the FTD Display filament.

C. SOURCE SELECT & AMPLIFIER PART

a) SHIFT REGISTER (AF CONTROL)

This shift register deliver commands from the µP to control the AF functions which include source selection (A0 & A1 control lines), DSC modes , DBB, IS and CD_ON. Other control lines such as MUTE, AMPON, STBY and PWM are coming directly from the µP on the Front board.

b) SOURCE SELECTION

One of the 4 sources, namely AUX, TAPE, TUNER, CD, can be selected via A0 & A1 lines which control the IC 7501 (HEF4052BT). Karaoke mic. mixing is connected to th e selected source before the signal is amplified with a buffer amplifier (Tr 7503 & 7504). The source signal is then split into recording path (for recording on tape) and main signal path (to the PWM volume control).

c) PWM VOLUME CONTROL

The discrete volume control makes use of 4 Transistors 7505, 7506, 7507 & 7508 (BC557B or ON4986) and PWM control signal from µP. For good performance transistors for the left and right channels should be paired for gain characteristics.

d) SOUND FEATURES

Sound Features include the DBB, IS and 4 DSC modes. The sound features are realised with a hex-inverter IC 7530 (HEF4069BT) as analog buffer/amplifier and transistors as electronic switches controlled by the shift registers (AF control).

e) POWER AMPLIFIER

IC 7391 (AN7125) is used as power amplifier.

f) CD ON CONTROL

This circuit switches on the supply +CD supply (derived from +12A) to CD servo control, HF circuit and the laser light pen on the CD Module during the CD mode only.

g) MATRIX SURROUND OUTPUT

The matrix surround feature is provided on board. This feature is only optional on certain type version.

D. KARAOKE & HEADPHONE PART

a) SIMPLE KARAOKE

This is a 1-mic. mono amplifier using discrete components. It has a level control using a rotary potmeter. This feature is available for some version only.

g) HEADPHONE OUTPUT

The headphone output is derived from the power amplifier output after the attenuation resistors which are tailored to deliver 18mW output power into a 32 ohm headphone.

Brief introduction of the Combi Board

A. TRANSFORMER PRIMARY PART

Transformer Primary Circuit provide connection for AC mains supply and primary wires of transformer.

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This circuit switches on the supply +CD supply (derived from +12A) to CD servo control, HF circuit and the laser light pen on the CD Module during the CD mode only.

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11-1

NOTES:

MAIN PART - COMPONENT LAYOUT

25	A4	1509	E3	2222	B3	2337	B5	2507	C3	3218	A5	3362	A7	5006	A3	6225	A3
26	E1	1510	E1	2223	B3	2338	C5	2508	D3	3246	B4	3363	A7	5007	A3	6226	A3
51	C1	1511	E3	2224	B2	2339	D5	2509	E3	3248	B4	3364	A6	5501	C1	6227	A3
52	D1	1512	E2	2225	C4	2342	C1	2526	E4	3256	B3	3365	B6	5502	D5	6228	B2
55	D2	1517	D1	2226	C4	2347	C7	2527	D4	3257	C3	3366	B6	5503	B6	6229	B2
56	E6	1518	D1	2227	A2	2348	C7	2536	C3	3258	C3	3373	A7	5504	B6	6230	A1
65	A5	1560	C5	2228	A1	2349	B7	2543	C4	3264	B1	3374	D7	5505	C6	6231	A1
1203	A4	1561	D6	2229	A2	2350	C6	2547	E4	3265	A1	3381	B7	5506	B6	6232	B3
1206	A3	1562	D6	2230	A4	2351	E7	2551	E2	3266	A1	3411	C2	5507	C5	6233	B3
1207	A2	1563	D5	2231	A4	2352	C7	2552	D2	3268	A1	3412	C2	5508	B6	6235	A6
1208	A1	1564	A3	2232	A5	2353	A6	2559	E2	3269	A1	3413	C2	5509	C1	6236	B4
1209	A3	1566	B7	2233	A4	2354	B6	2560	D3	3321	D4	3542	B2	5510	C1	6237	B4
1210	A2	1567	B7	2243	B5	2356	B6	2573	A7	3322	E4	3572	C3	5520	A5	6240	A3
1222	A2	1568	A2	2245	A5	2357	D6	2574	A7	3356	D7	3573	D3	5521	A5	6241	A2
1322	E7	1569	A4	2248	A6	2405	B1	2577	D3	3357	D7	3601	C1	6220	A2	6242	A2
1323	C7	1570	A2	2323	E5	2500	C4	2578	D2	3358	D7	3602	C2	6221	B2	6243	A2
1325	B7	2219	C4	2324	D5	2503	D4	2579	B1	3359	D7	3609	D4	6222	A2	6244	A3
1507	A7	2220	A2	2333	E6	2504	C4	2580	D3	3360	D7	3610	D4	6223	A2	6245	A3
1508	B1	2221	A2	2334	D6	2505	D5	2581	B2	3361	A7	5005	A3	6224	A3	6248	A3

6249	A3	6329	A6	7248	C4	9208	A4	9231	B4	9257	B2	9500	B1	9521	D3	9543	C2
6250	A3	6330	B2	7249	A1	9209	B4	9234	B4	9258	D5	9501	B1	9522	C3	9544	C2
6251	A3	6502	C2	7250	A5	9210	B5	9235	B6	9259	D5	9503	C1	9523	D3	9550	D5
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6255	A4	6552	A6	7401	C2	9218	B4	9240	C7	9288	A7	9507	C1	9527	D2		
6256	A4	6553	C2	7503	E2	9219	E2	9241	A4	9300	D7	9508	D2	9528	D1		
6257	A7	7233	A5	7504	D2	9220	C2	9242	A5	9301	D7	9509	C1	9529	C1		
6258	A7	7234	A6	7505	D3	9221	A5	9243	A4	9302	C7	9510	D2	9530	D1		
6269	A6	7235	A6	7506	D3	9222	B4	9244	C5	9305	A6	9511	D3	9531	D1		
6321	B6	7236	A7	7507	D3	9223	A4	9245	A7	9306	A6	9513	C2	9533	D1		
6322	C6	7237	A6	7508	D3	9224	B4	9246	D5	9307	C7	9514	C2	9534	D1		
6323	B6	7240	B4	9200	A1	9225	A5	9247	E5	9308	B5	9515	C2	9535	D2		
6324	C6	7241	B3	9201	A2	9226	A5	9248	C4	9309	B5	9516	C2	9536	E1		
6325	B6	7244	A4	9202	A2	9227	B5	9253	B5	9310	B5	9517	D3	9537	E1		
6326	A6	7245	A4	9204	A1	9228	B5	9254	B6	9311	B5	9518	E3	9538	E1		
6327	A6	7246	A4	9205	B1	9229	A5	9255	B6	9312	C6	9519	D5	9540	D2		
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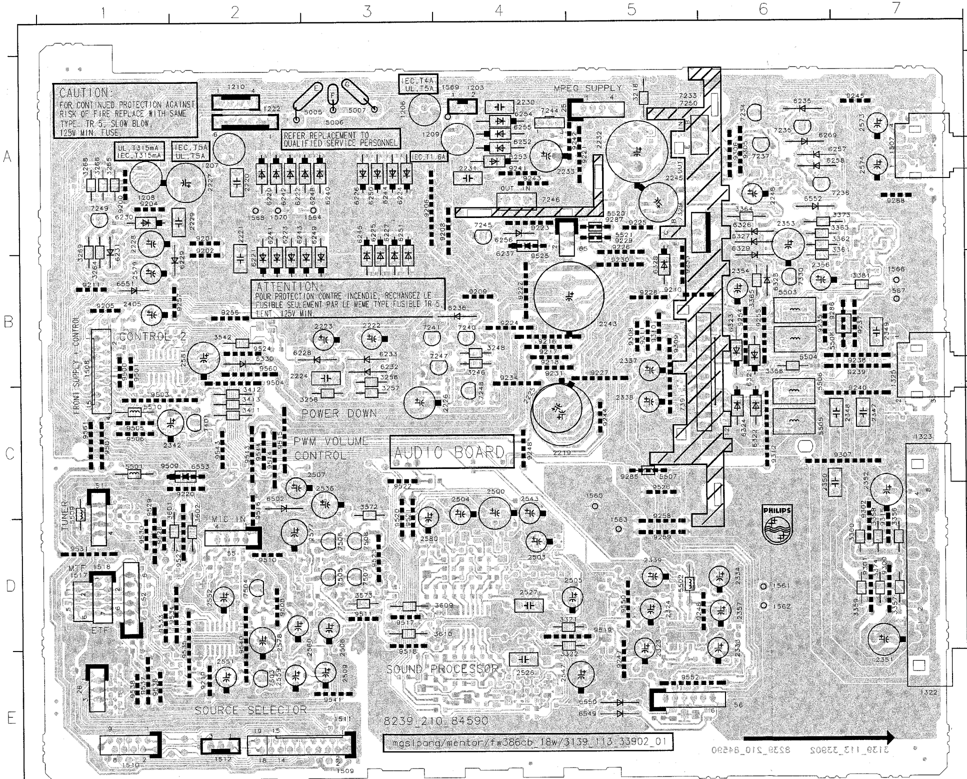

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

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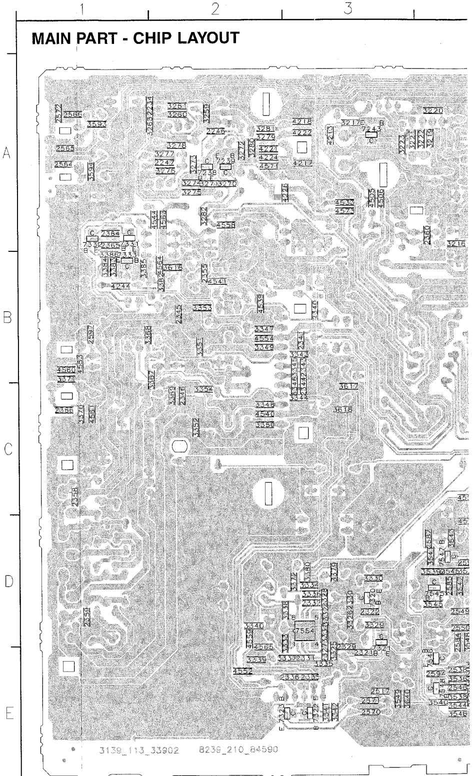
2235	A6	2361	D7	2521	D4	2555	D7	2588	D5	3223	A3	3280	A2	3346	C3	3387
2246	A2	2362	B6	2522	E4	2556	C7	2589	E5	3242	B4	3281	A2	3347	B2	3388
2247	A2	2363	B6	2523	D5	2557	E7	2591	C5	3243	C4	3282	A2	3348	C2	3390
2321	E3	2364	A1	2524	D4	2558	E7	2592	D5	3247	B4	3283	B4	3349	B2	3400
2322	D3	2365	A1	2525	D4	2561	E6	2593	D4	3249	B4	3325	E3	3350	C2	3401
2327	E3	2366	C1	2530	D6	2563	C7	2594	E4	3251	B7	3326	D3	3351	B2	3402
2328	D3	2400	C6	2531	D6	2564	A1	2595	D6	3252	B5	3329	D3	3352	C2	3403
2329	E3	2401	C6	2532	E4	2565	A1	2596	D6	3253	C5	3330	D3	3353	B2	3404
2330	D3	2402	B6	2533	D4	2566	A1	2597	B1	3254	C5	3331	D3	3354	C2	3406
2331	E3	2501	E6	2534	E4	2567	D4	2598	E5	3259	A2	3332	D3	3367	B2	3407
2332	D3	2502	D6	2535	D4	2568	B7	2599	E5	3260	A2	3333	D2	3368	B1	3409
2335	E3	2506	C6	2537	D4	2569	B7	3209	C4	3261	A2	3334	D3	3369	C2	3410
2336	E3	2510	D5	2538	E4	2570	E3	3210	C4	3263	A2	3335	E3	3370	C1	3501
2340	B3	2511	D5	2541	D4	2571	E3	3212	C4	3270	A2	3336	D3	3371	B1	3502
2341	B3	2512	D5	2542	E4	2572	A1	3213	B4	3271	A2	3337	E3	3372	D3	3503
2343	B3	2513	D5	2544	E6	2575	D4	3214	B4	3272	A2	3338	D2	3378	B7	3504
2344	C3	2514	D5	2545	D4	2576	E4	3215	C4	3273	A2	3339	E2	3379	D3	3505
2345	B2	2515	D5	2546	E4	2582	E5	3216	A4	3274	A2	3340	D2	3380	D3	3506
2346	C2	2516	D6	2548	E6	2583	D5	3217	A3	3275	A2	3341	E3	3382	B2	3507
2355	B2	2517	E3	2549	D4	2584	D4	3219	A4	3276	A2	3342	E3	3383	B1	3508
2358	C1	2518	D4	2550	D4	2585	D4	3220	A4	3277	A2	3343	B3	3384	B1	3509
2359	D1	2519	D4	2553	D7	2586	E4	3221	A3	3278	A2	3344	C3	3385	B1	3510

MAIN PART - CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For compor

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9210 B5 9235 B6 9259 D2 9502 B1 9523 D3 9545 B5
9211 B5 9236 B6 9260 C2 9503 B1 9524 D3 9546 B5
9216 B4 9238 B7 9266 B6 9504 C2 9525 B2 9550 B2
9217 B4 9239 B7 9267 A7 9505 C1 9526 B2 9561 C1
9218 B4 9240 C2 9268 A7 9506 B1 9527 B2
9219 B4 9241 A4 9269 D2 9507 B2 9528 B2
9220 C2 9242 C2 9270 A6 9508 B2 9529 B2
9221 A5 9243 A4 9271 D2 9509 C1 9530 B2
9222 B4 9244 C2 9302 A6 9510 D1 9531 D1
9223 A4 9245 C2 9303 A6 9511 D1 9532 D1
9224 B4 9246 C2 9304 A6 9512 D1 9533 D1
9225 A5 9247 C2 9305 B6 9513 D1 9534 D1
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9231 B5 9253 B6 9311 B6 9519 D2 9540 D2
9232 B5 9255 B6 9312 B6 9520 D2 9541 E3
9233 B5 9256 B2 9315 D7 9520 D3 9541 E3

2234 A2 2360 A4 2520 E4 2554 D7 2587 D4 3222 A4 3279 A2 3345 B3 3386 B1 3511 D4 3540 E4 3564 D6 3593 A1 4226 A3 4518 D5 4544 A2 4569 C4 7530 D4
2235 A6 2361 B6 2521 E4 2555 E7 2588 C5 3223 A3 3280 A2 3346 B2 3387 B6 3512 D6 3541 D4 3565 D7 3594 C1 4227 C2 4519 D5 4545 C6 4570 D6 7536 F2
2236 A2 2362 B6 2522 E4 2556 E7 2589 C5 3224 A3 3281 A2 3347 B2 3388 B6 3513 D6 3542 D4 3566 D7 3595 C1 4228 C2 4520 D5 4546 C6 4571 D6 7538 F2
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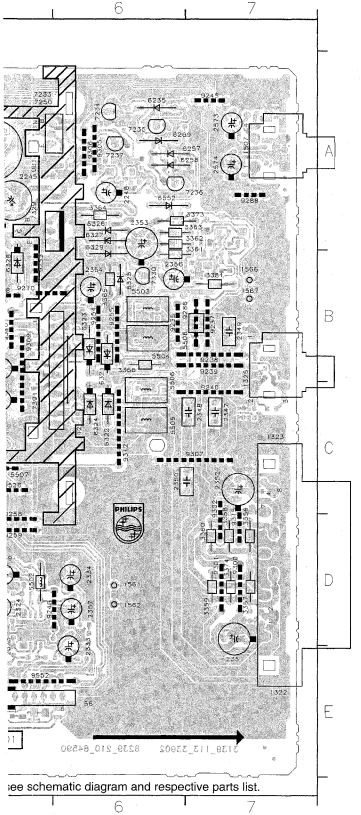
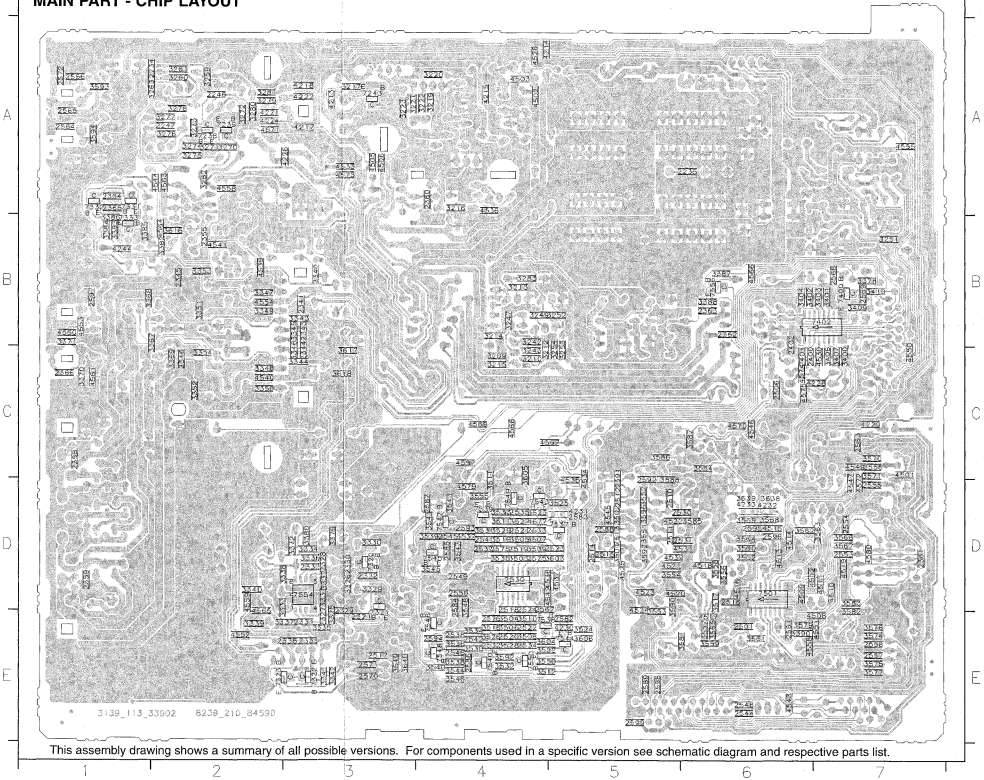


ee schematic diagram and respective parts list.

MAIN PART - CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

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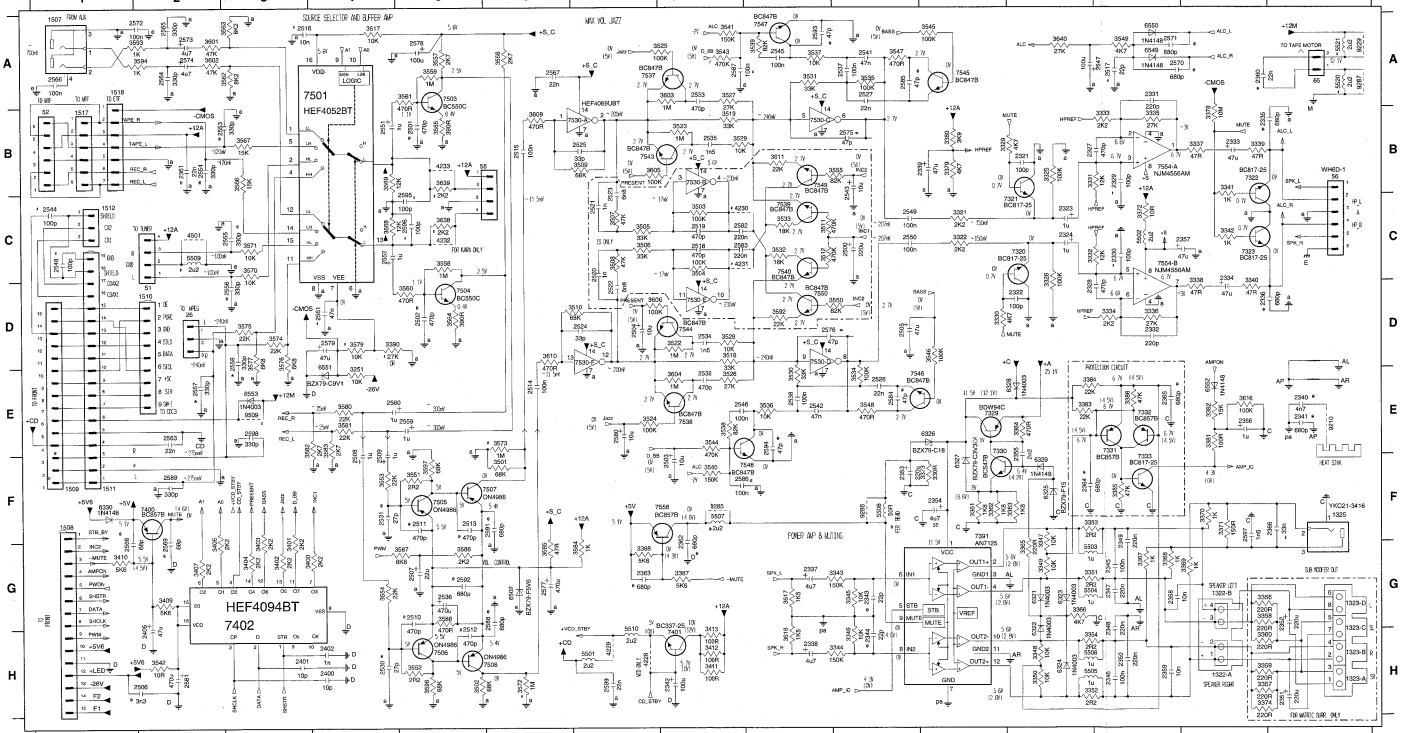
CIRCUIT DIAGRAM - SOURCE SELECT & AMPLIFIER PART



	In1	In2	JAZZ	Bass	Pop	Mix
JAZZ	X	X	L	H	L	L
rock	X	X	H	H	H	H
techno	X	X	H	H	L	H
Optimal	X	X	L	L	H	L
IS (vol 1-20)	H	H	X	X	X	X
IS (vol 1-24)	L	H	X	X	X	X

* Provision on layout
Δ For set with Karaoke
▲ For set without Karaoke
FOR VERSION CD ONLY
* For MPS

	AD	AS
AUX	x	x
TUNER	x	x
TAPE	x	x
CD	x	x

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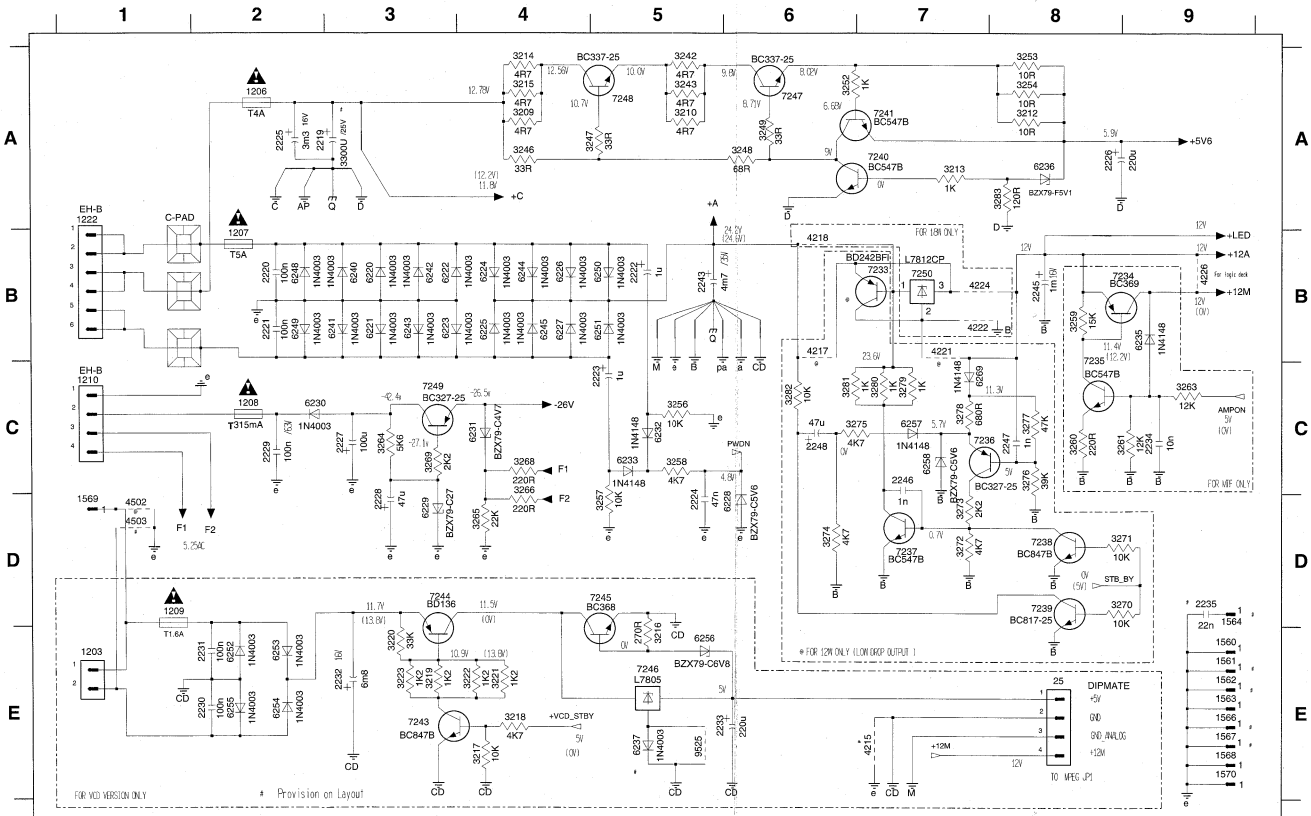
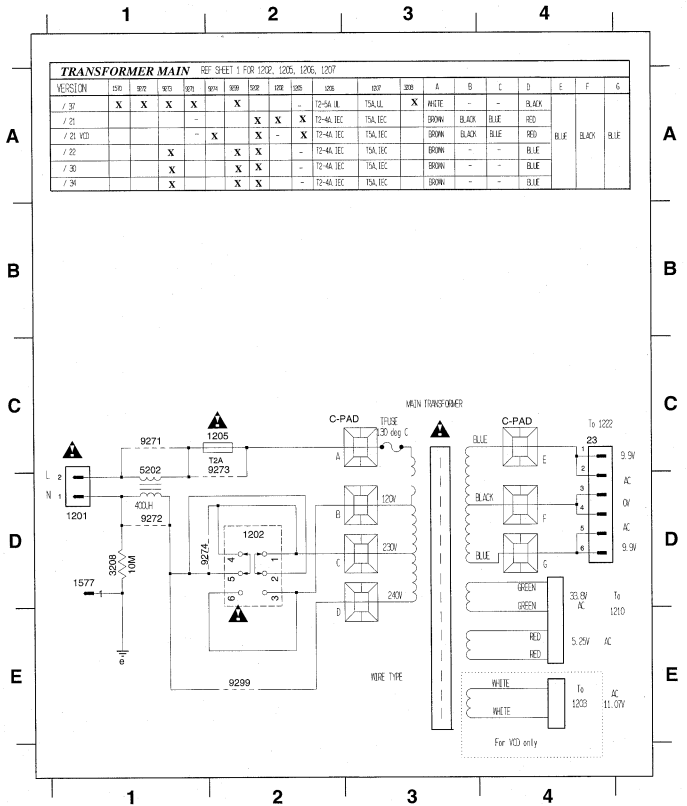
CIRCUIT DIAGRAM - POWER SUPPLY PART

25 E8	1222 A1	1567 E9	2222 B5	2229 C2	2243 B5	3212 A8	3219 E3	3246 A4	3256 C5	3264 C3	3272 D7	3279 C7	4218 B6	6220 B3	6227 B4	6235 B9	6244 B4	6253 E2	7233 B7	7240 A7	7248 A5
1203 E1	1560 E9	1568 E9	2223 C5	2230 E2	2245 B8	3213 A7	3220 E3	3247 A5	3257 D5	3265 D4	3273 D7	3280 C7	4221 B7	6221 B3	6228 D5	6236 A8	6245 B4	6254 E2	7234 B8	7241 A7	7249 C3
1206 A2	1561 E9	1569 D1	2224 D5	2231 E2	2246 C7	3214 A4	3221 E4	3248 A6	3258 C5	3266 C4	3274 D6	3281 C6	4222 B7	6222 B3	6229 D3	6237 E5	6248 B2	6255 E2	7235 C8	7243 E3	7250 B7
1207 B2	1562 E9	1570 E9	2225 A2	2232 E3	2247 C8	3215 A4	3222 E4	3249 A6	3259 B8	3268 C4	3275 C6	3282 C6	4224 B7	6223 B3	6230 C2	6240 B3	6249 B2	6256 E5	7236 C7	7244 D3	9525 E5
1208 C2	1563 E9	2219 A2	2226 A8	2233 E5	2248 C6	3216 E5	3223 E3	3252 A6	3260 C8	3269 C3	3276 C8	3283 A8	4226 B9	6224 B4	6231 C4	6241 B3	6250 B5	6257 C7	7237 D7	7245 D4	
1209 D1	1564 D9	2220 B2	2227 C3	2234 C9	3209 A4	3217 E4	3242 A5	3253 A8	3261 C9	3270 D8	3277 C8	4215 E7	4502 D1	6225 B4	6232 C5	6242 B3	6251 B5	6258 C7	7238 D8	7246 E5	
1210 C1	1566 E9	2221 B2	2228 D3	2235 D9	3210 A5	3218 E4	3243 A5	3254 A6	3263 C9	3271 D8	3278 C7	4217 B6	4503 D1	6226 B4	6233 C5	6243 B3	6252 E2	6269 C7	7239 D8	7247 A6	



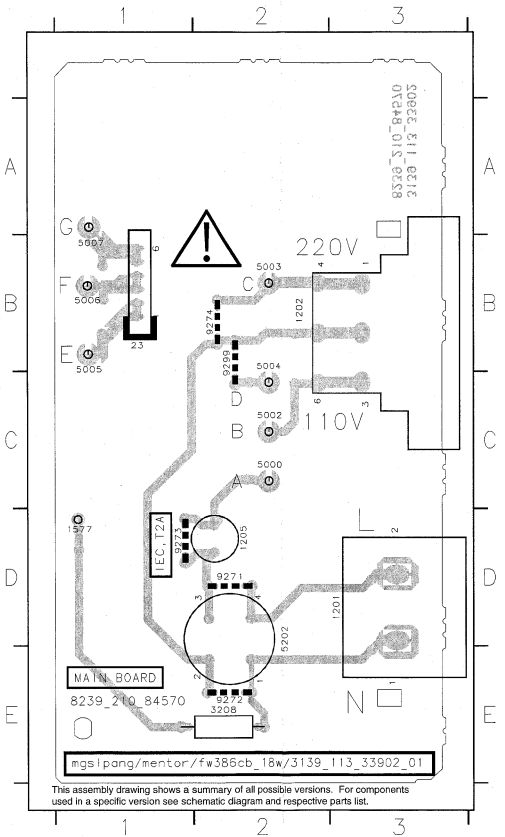
CIRCUIT DIAGRAM - TRANSFORMER PRIMARY PART

23 C4 1201 D1 1202 D2 1205 C2 1577 D1 3208 D1 5202 D1 9271 C1 9272 D1 9273 D2 9274 D1 9299 E2



COMPONENT LAYOUT - TRANSFORMER PRIMARY

23 B1 1577 D1 5003 B2 5007 B1 9273 D1
1201 D3 3208 E2 5004 B2 5202 D2 9274 B2
1202 B2 5000 A2 5005 B1 9271 D2 9299 B2
1205 D2 5002 C2 5006 B1 9272 E2



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

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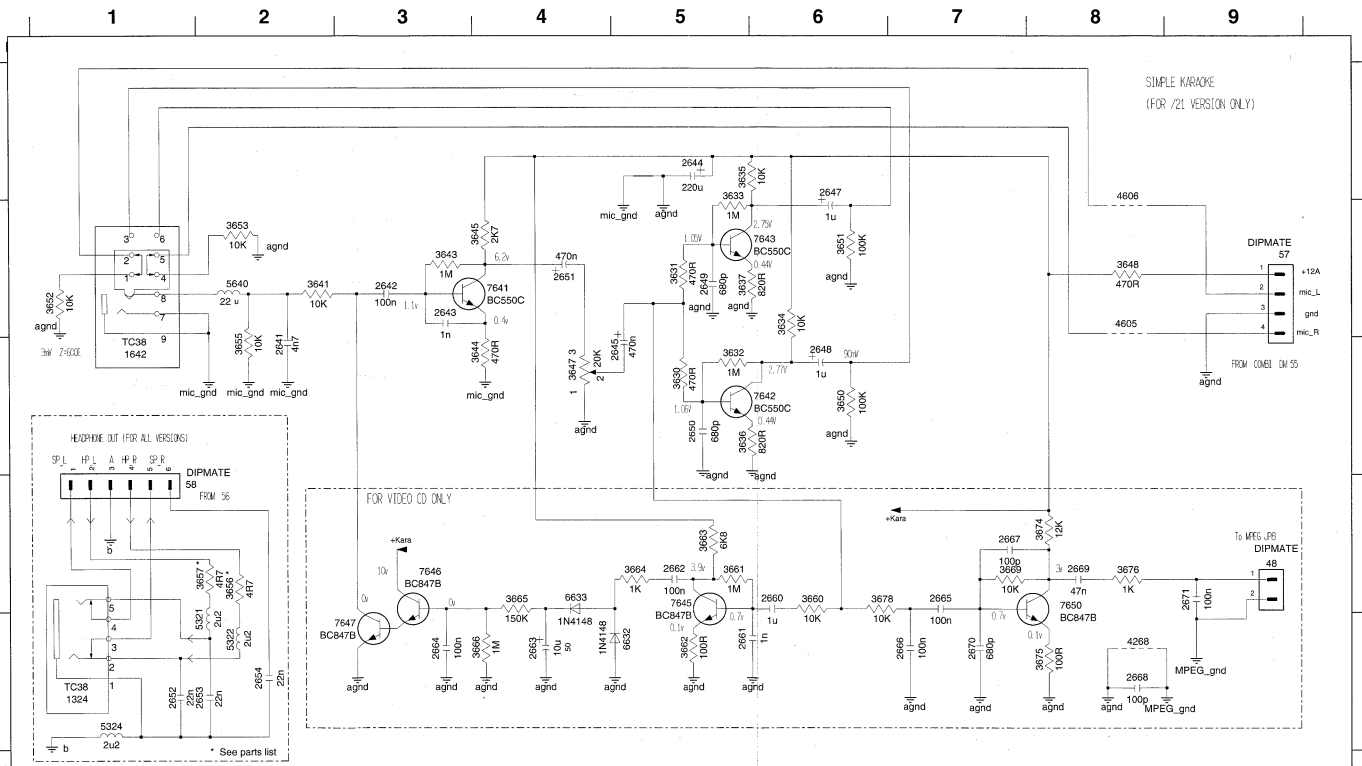
CIRCUIT DIAGRAM - KARAOKE & HEADPHONE PART

48 D9	1642 C1	2644 A5	2649 B5	2653 E2	2662 D5	2666 E7	2670 E7	3632 C5	3636 C5	3644 C4	3650 C6	3655 C2	3661 D5	3665 D4	3675 E8	4605 B8	5324 E1	7641 B4	7646 D3
57 B9	2641 C2	2645 C5	2650 C5	2654 E2	2663 E4	2667 D7	2671 D9	3633 A5	3637 B5	3645 B4	3651 B6	3656 D2	3662 E5	3666 E4	3676 D8	4606 A8	5640 B2	7642 C6	7647 E3
58 D1	2642 B3	2647 A6	2651 B4	2660 D6	2664 E3	2668 E8	3630 C5	3634 B6	3641 B2	3647 C4	3652 B1	3657 D2	3663 D5	3669 D7	3678 D6	5321 E2	6632 E5	7643 B6	7650 D8
1324 E1	2643 B3	2648 C6	2652 E1	2661 E5	2665 D7	2669 D8	3631 B5	3635 A5	3643 B3	3648 B8	3653 B2	3660 D6	3664 D5	3674 D8	4268 E8	5322 E2	6633 D4	7645 D5	



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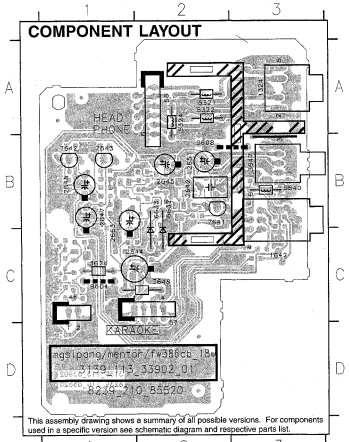
KARAOKE & HEADPHONE PART

48 C1	2642 B2	2651 B2	5321 A2	6633 B2	9608 B2	
58 D4	2643 C1	2653 C1	5322 A2	7641 B2		
74 A3	2645 B1	2647 B1	5324 A2	7642 C1		
1324 A3	2647 B1	3648 C2	5640 B3	7643 B1		
1842 C3	2648 B1	3674 C1	6632 B2	9604 C1		

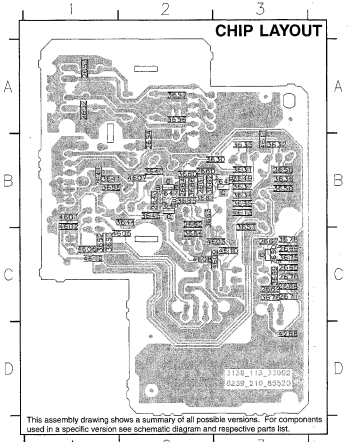
2641 B1	2665 C3	3634 B3	3653 C1	3669 C1	4608 C2		
2643 B2	2666 C3	3635 B3	3655 B1	3670 C1	4609 C3		
2648 B1	2667 C3	3636 B3	3656 A1	3678 C3	4610 A3		
2650 B3	2668 C3	3637 B3	3657 A1	3679 C3	4611 B3		
2652 A1	2669 C3	3641 B1	3658 B3	3768 D3	4612 C1		
2653 A1	2670 C3	3643 B2	3661 B3	4601 B1	4613 B4		
2654 B2	2671 C3	3644 B2	3662 B3	4602 B1	7645 B3		
2660 B2	3630 B3	3645 B4	3663 B3	4603 C2	7648 B2		
2661 B2	3631 B3	3646 B4	3664 B3	4605 C2	7649 B2		
2662 B2	3632 B3	3651 C3	3665 B3	4606 C1	7650 C3		
2664 B2	3633 B3	3652 C1	3666 B2	4607 B2			

COMPONENT LAYOUT



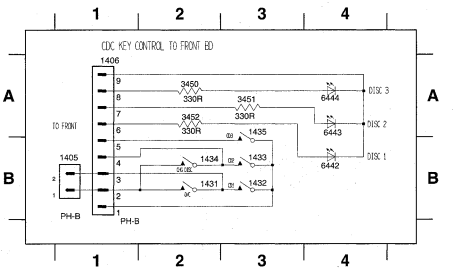
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

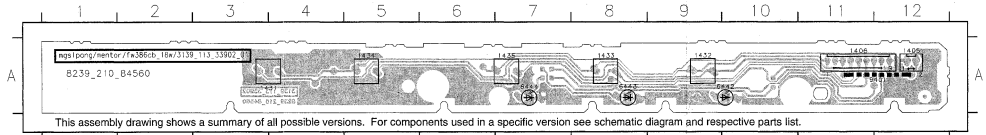
CDC KEY PART - CIRCUIT



1405 B
1406 A
1431 B
1432 B
1433 B
1434 B
1435 A
3450 A
3451 A
3452 A
6442 B
6443 A
6444 A

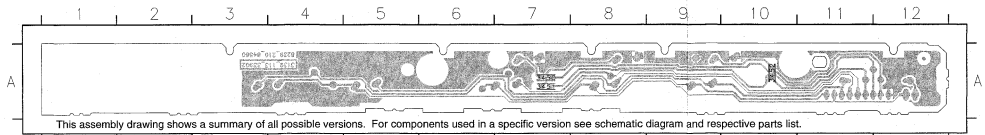
CDC KEY PART - COMPONENT & CHIP LAYOUT

1405 A12 1406 A11 1431 A3 1432 A9 1433 A8 1434 A5 1435 A7 6442 A10 6443 A8 6444 A7 9401 A12



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

3450 A7 3451 A7 3452 A10



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

ELECTRICAL PARTS LIST - COMBI BOARD

MISCELLANEOUS

1201	4822 265 31015	⚠	Mains Socket
1206	4822 071 54002	⚠	Fuse T4A 250V
1207	4822 071 55002	⚠	Fuse T5A 250V
1208	4822 071 53151	⚠	Fuse T315mA 250V
1322	4822 267 31176		Loudspeaker Socket
1324	4822 265 11547		Headphone Socket
1325	4822 267 31729		Subwoofer-Out Socket
1431	4822 276 13775		Tact Switch
1432	4822 276 13775		Tact Switch
1433	4822 276 13775		Tact Switch
1434	4822 276 13775		Tact Switch
1435	4822 276 13775		Tact Switch
1507	4822 265 20553		Aux-In Socket
1508	4822 265 10981		Flex Socket 15Pin Vert.
1510	4822 265 11532		Flex Socket 9Pin Vert.
1511	4822 267 10552		Flex Socket 19Pin Vert.
1518	4822 267 10953		Flex Socket 7Pin Vert.

CAPACITORS

2220	5322 121 42386	100nF 5% 63V
2221	5322 121 42386	100nF 5% 63V
2222	4822 124 40242	1µF 20% 63V
2223	4822 124 40242	1µF 20% 63V
2224	4822 121 51399	47nF 10% 50V
2225	4822 124 40784	3300µF 20% 16V
2226	4822 124 22263	220µF 20% 25V
2227	4822 124 40255	100µF 20% 63V
2228	4822 124 41751	47µF 20% 50V
2229	5322 121 42386	100nF 5% 63V
2243	4822 124 80563	4700µF 20% 35V
2245	4822 123 14024	1000µF 20% 16V
2321	5322 122 32531	100pF 5% 50V
2322	5322 122 32531	100pF 5% 50V
2323	4822 124 40242	1µF 20% 63V
2324	4822 124 40242	1µF 20% 63V
2327	5322 122 34099	470pF 10% 63V
2328	5322 122 34099	470pF 10% 63V
2331	4822 122 33575	220pF 5% 50V
2332	4822 122 33575	220pF 5% 50V
2333	4822 124 40433	47µF 20% 25V
2334	4822 124 40433	47µF 20% 25V
2335	4822 122 32535	680pF 10% 63V
2336	4822 122 32535	680pF 10% 63V
2337	4822 124 40769	4,7µF 20% 50V
2338	4822 124 40769	4,7µF 20% 50V
2339	4822 124 40433	47µF 20% 25V
2340	5322 126 10223	4,7nF 10% 63V
2341	4822 122 32535	680pF 10% 63V
2342	4822 124 81029	100µF 20% 25V
2343	5322 122 32658	22pF 5% 50V
2344	5322 122 32658	22pF 5% 50V
2345	4822 126 13196	100nF 10% 16V
2346	4822 126 13196	100nF 10% 16V
2347	4822 121 42408	220nF 5% 63V
2348	4822 121 42408	220nF 5% 63V
2349	4822 121 42408	220nF 5% 63V
2350	4822 121 42408	220nF 5% 63V
2353	4822 124 22263	220µF 20% 25V
2354	4822 124 40769	4,7µF 20% 50V
2355	4822 122 33175	2,2nF 20% 50V
2356	4822 124 40242	1µF 20% 63V
2357	4822 124 40433	47µF 20% 25V
2358	4822 122 33177	10nF 20% 50V
2359	4822 122 33177	10nF 20% 50V
2360	5322 122 32654	22nF 10% 63V
2361	5322 122 32654	22nF 10% 63V
2362	4822 122 32535	680pF 10% 63V
2363	4822 122 32535	680pF 10% 63V
2364	4822 122 32535	680pF 10% 63V
2365	4822 122 32535	680pF 10% 63V
2400	5322 122 32448	10pF 5% 50V
2401	5322 122 32448	10pF 5% 50V
2402	5322 122 34123	1nF 10% 50V
2405	4822 124 40433	47µF 20% 25V
2500	4822 124 22263	220µF 20% 25V
2501	5322 122 32268	470pF 10% 50V
2502	5322 122 32268	470pF 10% 50V
2503	4822 124 41579	10µF 20% 50V
2504	4822 124 41579	10µF 20% 50V
2505	4822 124 40433	47µF 20% 25V
2506	4822 122 33891	3,3nF 10% 50V
2507	4822 124 81151	22µF 50V
2508	4822 124 40242	1µF 20% 63V
2509	4822 124 40242	1µF 20% 63V
2510	5322 122 34099	470pF 10% 63V
2511	5322 122 34099	470pF 10% 63V
2512	5322 122 34099	470pF 10% 63V
2513	5322 122 34099	470pF 10% 63V
2514	4822 126 10002	100nF 20% 25V
2515	4822 126 10002	100nF 20% 25V
2518	5322 122 34099	470pF 10% 63V
2519	5322 122 34099	470pF 10% 63V
2520	5322 122 34123	1nF 10% 50V
2521	5322 122 34123	1nF 10% 50V
2522	5322 122 31866	6,8nF 10% 50V
2523	5322 122 31866	6,8nF 10% 50V
2524	5322 122 32659	33pF 5% 50V
2525	5322 122 32659	33pF 5% 50V
2526	4822 121 41856	22nF 10% 50V
2527	4822 121 41856	22nF 10% 50V
2530	4822 126 13691	27pF 5% 50V
2531	4822 126 13691	27pF 5% 50V
2532	5322 122 34099	470pF 10% 63V
2533	5322 122 34099	470pF 10% 63V

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ELECTRICAL PARTS LIST - COMBI BOARD

2534	5322 122 31865	1,5nF 10% 50V
2535	5322 122 31865	1,5nF 10% 50V
2536	4822 124 80195	470µF 20% 10V
2537	4822 126 10002	100nF 20% 25V
2538	4822 126 10002	100nF 20% 25V
2541	4822 126 13751	47nF 10% 63V
2542	4822 126 13751	47nF 10% 63V
2543	4822 124 41579	10µF 20% 50V
2545	4822 126 10002	100nF 20% 25V
2546	4822 126 10002	100nF 20% 25V
2547	4822 124 41584	100µF 20% 10V
2549	4822 126 10002	100nF 20% 25V
2550	4822 126 10002	100nF 20% 25V
2551	4822 124 40242	1µF 20% 63V
2552	4822 124 40242	1µF 20% 63V
2553	4822 122 33805	330pF 10% 63V
2554	4822 122 33805	330pF 10% 63V
2555	4822 122 33805	330pF 10% 63V
2556	4822 122 33805	330pF 10% 63V
2559	4822 124 40242	1µF 20% 63V
2560	4822 124 40242	1µF 20% 63V
2563	5322 122 32654	22nF 10% 63V
2564	4822 122 33805	330pF 10% 63V
2565	4822 122 33805	330pF 10% 63V
2566	4822 126 10002	100nF 20% 25V
2567	5322 122 32654	22nF 10% 63V
2568	4822 126 13694	68pF 1% 63V
2569	4822 126 13694	68pF 1% 63V
2570	4822 122 32535	680pF 10% 50V
2571	4822 122 32535	680pF 10% 50V
2572	4822 126 10002	100nF 20% 25V
2573	4822 124 40769	4,7µF 20% 50V
2574	4822 124 40769	4,7µF 20% 50V
2577	4822 124 80195	470µF 20% 10V
2578	4822 124 81029	100µF 20% 25V
2579	4822 124 40433	47µF 20% 25V
2580	4822 124 41579	10µF 20% 50V
2581	4822 124 80195	470µF 20% 10V
2582	4822 126 13061	220nF 20% 25V
2583	4822 126 13061	220nF 20% 25V
2584	4822 126 13692	47pF 5% 50V
2585	4822 126 13692	47pF 5% 50V
2588	4822 122 32535	680pF 10% 63V
2589	4822 122 33805	330pF 10% 63V
2591	4822 122 32535	680pF 10% 63V
2592	4822 122 32535	680pF 10% 63V
2593	4822 126 13692	47pF 5% 50V
2594	4822 126 13692	47pF 5% 50V
2597	5322 122 31865	1,5nF 10% 63V
2598	4822 122 33805	330pF 10% 63V
2599	5322 122 32654	22nF 10% 63V
2652	5322 122 32654	22nF 10% 63V
2653	5322 122 32654	22nF 10% 63V
2654	5322 122 32654	22nF 10% 63V

RESISTORS

3209	4822 051 20478	4R7 5% 0,1W
3210	4822 051 20478	4R7 5% 0,1W
3212	4822 051 20109	10R 5% 0,1W
3213	4822 051 10102	1k 2% 0,25W
3214	4822 051 20478	4R7 5% 0,1W
3215	4822 051 20478	4R7 5% 0,1W
3242	4822 051 20478	4R7 5% 0,1W
3243	4822 051 20478	4R7 5% 0,1W
3246	4822 116 52191	33R 5% 0,5W
3247	4822 051 20339	33R 5% 0,1W
3248	4822 116 52199	68R 5% 0,5W
3249	4822 051 20339	33R 5% 0,1W
3251	4822 117 10833	10k 1% 0,1W
3252	4822 051 10102	1k 2% 0,25W
3253	4822 051 20109	10R 5% 0,1W
3254	4822 051 20109	10R 5% 0,1W
3256	4822 116 83864	10k 5% 0,5W
3257	4822 116 83864	10k 5% 0,5W
3258	4822 116 52283	4k7 5% 0,5W
3264	4822 116 52289	5k6 5% 0,5W
3265	4822 116 52257	22k 5% 0,5W
3266	4822 116 83872	220R 5% 0,5W
3268	4822 116 83872	220R 5% 0,5W
3269	4822 116 52256	2k2 5% 0,5W
3283	4822 051 20121	120R 5% 0,1W
3321	4822 116 52256	2k2 5% 0,5W
3322	4822 116 52256	2k2 5% 0,5W
3325	4822 051 20104	100k 5% 0,1W
3326	4822 051 20104	100k 5% 0,1W
3329	4822 051 20472	4k7 5% 0,1W
3330	4822 051 20472	4k7 5% 0,1W
3331	4822 117 11383	12k 1% 0,1W
3332	4822 117 11383	12k 1% 0,1W
3333	4822 117 11449	2k2 1% 0,1W
3334	4822 117 11449	2k2 1% 0,1W
3335	4822 051 20273	27k 5% 0,1W
3336	4822 051 20273	27k 5% 0,1W
3337	4822 051 20479	47R 5% 0,1W
3338	4822 051 20479	47R 5% 0,1W
3339	4822 051 20479	47R 5% 0,1W
3340	4822 051 20479	47R 5% 0,1W
3341	4822 051 10102	1k 2% 0,25W
3342	4822 051 10102	1k 2% 0,25W
3343	4822 051 20154	150k 5% 0,1W
3344	4822 051 20154	150k 5% 0,1W
3345	4822 117 10833	10k 1% 0,1W
3346	4822 117 10833	10k 1% 0,1W
3347	4822 117 10833	10k 1% 0,1W

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RESISTORS

3348	4822 117 10833	10k 1% 0,1W
3349	4822 117 10833	10k 1% 0,1W
3350	4822 117 10833	10k 1% 0,1W
3351	4822 051 20228	2R2 5% 0,1W
3352	4822 051 20228	2R2 5% 0,1W
3353	4822 051 20228	2R2 5% 0,1W
3354	4822 051 20228	2R2 5% 0,1W
3361	4822 116 52249	1k8 5% 0,5W
3362	4822 116 52249	1k8 5% 0,5W
3363	4822 116 52249	1k8 5% 0,5W
3364	4822 116 83883	470R 5% 0,5W
3365	4822 116 83872	220R 5% 0,5W
3366	4822 116 52283	4k7 5% 0,5W
3367	4822 051 10102	1k 2% 0,25W
3368	4822 051 10102	1k 2% 0,25W
3369	4822 051 10102	1k 2% 0,25W
3370	4822 051 10102	1k 2% 0,25W
3371	4822 117 10353	150R 1% 0,1W
3372	4822 051 20109	10R 5% 0,1W
3373	4822 116 52219	330R 5% 0,5W
3378	4822 051 20106	10M 5% 0,1W
3379	4822 051 20472	4k7 5% 0,1W
3380	4822 051 20392	3k9 5% 0,1W
3381	4822 116 52175	100R 5% 0,5W
3382	4822 051 20153	15k 5% 0,1W
3383	4822 051 20223	22k 5% 0,1W
3384	4822 051 20223	22k 5% 0,1W
3385	4822 117 10834	47k 1% 0,1W
3386	4822 117 10834	47k 1% 0,1W
3387	4822 051 20562	5k6 5% 0,1W
3388	4822 051 20562	5k6 5% 0,1W
3390	4822 051 20008	0R Jumper 0805
3400	4822 117 11449	2k2 1% 0,1W
3401	4822 117 11449	2k2 1% 0,1W
3402	4822 117 11449	2k2 1% 0,1W
3403	4822 117 11449	2k2 1% 0,1W
3404	4822 117 11449	2k2 1% 0,1W
3406	4822 117 11449	2k2 1% 0,1W
3407	4822 117 11449	2k2 1% 0,1W
3409	4822 051 20562	5k6 5% 0,1W
3410	4822 051 20562	5k6 5% 0,1W
3411	4822 116 52175	100R 5% 0,5W
3412	4822 116 52175	100R 5% 0,5W
3413	4822 116 52175	100R 5% 0,5W
3450	4822 051 20331	330R 5% 0,1W
3451	4822 051 20331	330R 5% 0,1W
3452	4822 051 20331	330R 5% 0,1W
3501	4822 051 20683	68k 5% 0,1W
3502	4822 051 20683	68k 5% 0,1W
3503	4822 051 20104	100k 5% 0,1W
3504	4822 051 20104	100k 5% 0,1W
3505	4822 051 20333	33k 5% 0,1W
3506	4822 051 20333	33k 5% 0,1W
3507	4822 117 10834	47k 5% 0,1W
3508	4822 117 10834	47k 5% 0,1W
3509	4822 051 20683	68k 5% 0,1W
3510	4822 051 20683	68k 5% 0,1W
3511	4822 051 20474	470k 5% 0,1W
3512	4822 051 20474	470k 5% 0,1W
3517	4822 117 10833	10k 1% 0,1W
3518	4822 051 20333	33k 5% 0,1W
3519	4822 051 20333	33k 5% 0,1W
3522	4822 051 20105	1M 5% 0,1W
3523	4822 051 20105	1M 5% 0,1W
3524	4822 051 20104	100k 5% 0,1W
3525	4822 051 20104	100k 5% 0,1W
3526	4822 051 20273	27k 5% 0,1W
3527	4822 051 20273	27k 5% 0,1W
3528	4822 117 10833	10k 5% 0,1W
3529	4822 117 10833	10k 5% 0,1W
3530	4822 051 20333	33k 5% 0,1W
3531	4822 051 20333	33k 5% 0,1W
3532	4822 117 10965	18k 5% 0,1W
3533	4822 117 10965	18k 5% 0,1W
3534	4822 051 20104	100k 5% 0,1W
3535	4822 051 20104	100k 5% 0,1W
3536	4822 117 10833	10k 5% 0,1W
3537	4822 117 10833	10k 5% 0,1W
3538	4822 117 11149	82k 1% 0,1W
3539	4822 117 11149	82k 1% 0,1W
3540	4822 051 20154	150k 5% 0,1W
3541	4822 051 20154	150k 5% 0,1W
3542	4822 116 52176	10R 5% 0,5W
3543	4822 051 20474	470k 5% 0,1W
3544	4822 051 20474	470k 5% 0,1W
3545	4822 051 20104	100k 5% 0,1W
3546	4822 051 20104	100k 5% 0,1W
3547	4822 051 20471	470R 5% 0,1W
3548	4822 051 20471	470R 5% 0,1W
3549	4822 051 20472	4k7 5% 0,1W
3550	4822 117 11149	82k 5% 0,1W
3551	4822 051 20228	2R2 5% 0,1W
3552	4822 051 20228	2R2 5% 0,1W
3553	4822 051 20223	22k 1% 0,1W
3554	4822 051 20223	22k 1% 0,1W
3555	4822 117 11149	82k 5% 0,1W
3556	4822 117 12955	2k7 1% 0,1W
3557	4822 117 12955	2k7 1% 0,1W
3558	4822 051 20105	1M 5% 0,1W
3559	4822 051 20105	1M 5% 0,1W
3560	4822 051 20471	470R 5% 0,1W
3561	4822 051 20471	470R 5% 0,1W
3562	4822 051 20822	8k2 5% 0,1W
3563	4822 051 20822	8k2 5% 0,1W
3564	4822 051 20391	390R 5% 0,1W
3565	4822 051 20391	390R 5% 0,1W
3566	4822 051 20153	15k 5% 0,1W
3567	4822 051 20153	15k 5% 0,1W
3568	4822 117 11383	12k 1% 0,1W
3569	4822 117 11383	12k 1% 0,1W
3570	4822 117 10833	10k 1% 0,1W
3571	4822 117 10833	10k 1% 0,1W
3574	4822 051 20273	27k 5% 0,1W
3575	4822 051 20273	27k 5% 0,1W
3576	4822 117 11507	6k8 5% 0,1W
3577	4822 117 11507	6k8 5% 0,1W
3580	4822 051 20223	22k 5% 0,1W
3581	4822 051 20223	22k 5% 0,1W
3582	4822 117 12955	2k7 1% 0,1W
3583	4822 117 12955	2k7 1% 0,1W
3584	4822 051 10102	1k 2% 0,25W
3585	4822 051 20479	47R 5% 0,1W
3586	4822 117 11449	2k2 1% 0,1W
3587	4822 117 11507	6k8 1% 0,1W
3588	4822 051 20471	470R 5% 0,1W
3592	4822 051 20223	22k 5% 0,1W
3593	4822 051 10102	1k 2% 0,25W
3594	4822 051 10102	1k 2% 0,25W
3596	4822 051 20683	68k 5% 0,1W
3597	4822 051 20683	68k 5% 0,1W
3601	4822 116 83884	47k 5% 0,5W
3602	4822 116 83884	47k 5% 0,5W
3603	4822 051 20105	1M 5% 0,1W
3604	4822 051 20105	1M 5% 0,1W
3605	4822 051 20104	100k 5% 0,1W
3606	4822 051 20104	100k 5% 0,1W
3609	4822 116 83883	470R 5% 0,5W
3610	4822 116 83883	470R 5% 0,5W
3611	4822 051 20223	22k 5% 0,1W
3616	4822 051 20104	100k 5% 0,1W
3617	4822 117 11139	1k5 1% 0,1W
3618	4822 117 11139	1k5 1% 0,1W
3640	4822 051 20273	27k 5% 0,1W
3656	4822 051 20008	0R Jumper 0805
3657	4822 051 20008	0R Jumper 0805
4214	4822 051 20008	0R Jumper 0805
4218	4822 051 20008	0R Jumper 0805
4222	4822 051 20008	0R Jumper 0805
4224	4822 051 20008	0R Jumper 0805
4226	4822 051 20008	0R Jumper 0805
4229	4822 051 20008	0R Jumper 0805
4244	4822 051 20008	0R Jumper 0805
4501	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4505	4822 051 20008	0R Jumper 0805
4506	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4514	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4525	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4538	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4542	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805
4544	4822 051 20008	0R Jumper 0805
4545	4822 051 20008	0R Jumper 0805
4546	4822 051 20008	0R Jumper 0805
4547	4822 051 20008	0R Jumper 0805
4549	4822 051 20008	0R Jumper 0805
4550	4822 051 20008	0R Jumper 0805
4551	4822 051 20008	0R Jumper 0805
4552	4822 051 20008	0R Jumper 0805
4553	4822 051 20008	0R Jumper 0805
4554	4822 051 20008	0R Jumper 0805
4555	4822 051 20008	0R Jumper 0805
4556	4822 051 20008	0R Jumper 0805
4557	4822 051 20008	0R Jumper 0805
4558	4822 051 20008	0R Jumper 0805
4559	4822 051 20008	0R Jumper 0805
4560	4822 051 20008	0R Jumper 0805
4561	4822 051 20008	0R Jumper 0805
4563	4822 051 20008	0R Jumper 0805
4564	4822 051 20008	0R Jumper 0805

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RESISTORS

4565	4822 051 20008	0R Jumper 0805
4566	4822 051 20008	0R Jumper 0805
4567	4822 051 20008	0R Jumper 0805
4568	4822 051 20008	0R Jumper 0805
4569	4822 051 20008	0R Jumper 0805
4570	4822 051 20008	0R Jumper 0805
4571	4822 051 20008	0R Jumper 0805
4572	4822 051 20008	0R Jumper 0805
4573	4822 051 20008	0R Jumper 0805
4574	4822 051 20008	0R Jumper 0805
4575	4822 051 20008	0R Jumper 0805
4579	4822 051 20008	0R Jumper 0805
4580	4822 051 20008	0R Jumper 0805
4677	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5202	4822 157 71285	Coil 400µH 30%
5321	4822 157 11477	Coil 2,2µH 5%
5322	4822 157 11477	Coil 2,2µH 5%
5324	4822 157 11477	Coil 2,2µH 5%
5501	4822 157 11477	Coil 2,2µH 5%
5502	4822 157 11477	Coil 2,2µH 5%
5503	4822 157 62255	coil 18,5 turns
5504	4822 157 62255	coil 18,5 turns
5505	4822 157 62255	coil 18,5 turns
5506	4822 157 62255	coil 18,5 turns
5507	4822 157 11477	Coil 2,2µH 5%
5508	4822 526 10704	Fe Bead 100MHz
5510	4822 157 11477	Coil 2,2µH 5%
5522	4822 157 11477	Coil 2,2µH 5%

DIODES

6220	4822 130 31878	1N4003G
6221	4822 130 31878	1N4003G
6222	4822 130 31878	1N4003G
6223	4822 130 31878	1N4003G
6224	4822 130 31878	1N4003G
6225	4822 130 31878	1N4003G
6226	4822 130 31878	1N4003G
6227	4822 130 31878	1N4003G
6228	4822 130 34173	BZX79-B5V6
6229	4822 130 34379	BZX79-B27
6230	4822 130 31878	1N4003G
6231	4822 130 34174	BZX79-B4V7
6232	4822 130 30621	1N4148
6233	4822 130 30621	1N4148
6236	4822 130 34233	BZX79-B5V1
6240	4822 130 31878	1N4003G
6241	4822 130 31878	1N4003G
6242	4822 130 31878	1N4003G
6243	4822 130 31878	1N4003G
6244	4822 130 31878	1N4003G
6245	4822 130 31878	1N4003G
6248	4822 130 31878	1N4003G
6249	4822 130 31878	1N4003G
6250	4822 130 31878	1N4003G
6251	4822 130 31878	1N4003G
6321	4822 130 31878	1N4003G
6322	4822 130 31878	1N4003G
6323	4822 130 31878	1N4003G
6324	4822 130 31878	1N4003G
6325	4822 130 34281	BZX79-B15
6326	4822 130 31024	BZX79-B18
6327	5322 130 31504	BZX79-B3V3
6328	4822 130 31878	1N4003G
6329	4822 130 30621	1N4148
6330	4822 130 30621	1N4148
6442	4822 130 10792	LTL-1CHPE
6443	4822 130 10792	LTL-1CHPE
6444	4822 130 10792	LTL-1CHPE
6502	4822 130 34173	BZX79-B5V6
6549	4822 130 30621	1N4148
6550	4822 130 30621	1N4148
6551	4822 130 30862	BZX79-B9V1
6552	4822 130 30621	1N4148
6553	4822 130 31878	1N4003G

TRANSISTORS

7240	4822 130 40959	BC547B
7241	4822 130 40959	BC547B
7247	4822 130 40981	BC337-25
7248	4822 130 40981	BC337-25
7249	4822 130 41246	BC327-25
7250	4822 209 33575	L7812CP
7320	4822 130 42804	BC817-25
7321	4822 130 42804	BC817-25
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7329	4822 130 10847	BDW94C
7330	4822 130 40959	BC547B
7331	5322 130 60508	BC857B
7332	5322 130 60508	BC857B
7333	4822 130 42804	BC817-25
7391	4822 209 16224	AN7125
7400	5322 130 60508	BC857B
7401	4822 130 40981	BC337-25
7402	5322 209 11306	HEF4094BT
7501	5322 209 11102	HEF4052BT
7503	4822 130 41096	BC550C
7504	4822 130 41096	BC550C
7505	4822 130 44568	ON4986
7506	4822 130 44568	ON4986
7507	4822 130 44568	ON4986
7508	4822 130 44568	ON4986
7530	5322 209 14482	HEF4069UBT
7537	4822 130 60511	BC847B
7538	4822 130 60511	BC847B
7539	4822 130 60511	BC847B
7540	4822 130 60511	BC847B
7543	4822 130 60511	BC847B
7544	4822 130 60511	BC847B
7545	4822 130 60511	BC847B
7546	4822 130 60511	BC847B
7547	4822 130 60511	BC847B
7548	4822 130 60511	BC847B
7549	4822 130 60511	BC847B
7550	4822 130 60511	BC847B
7554	4822 209 31378	NJM4556MB
7556	5322 130 60508	BC857B

Note: Only the parts mentioned in this list are normal service spare parts.

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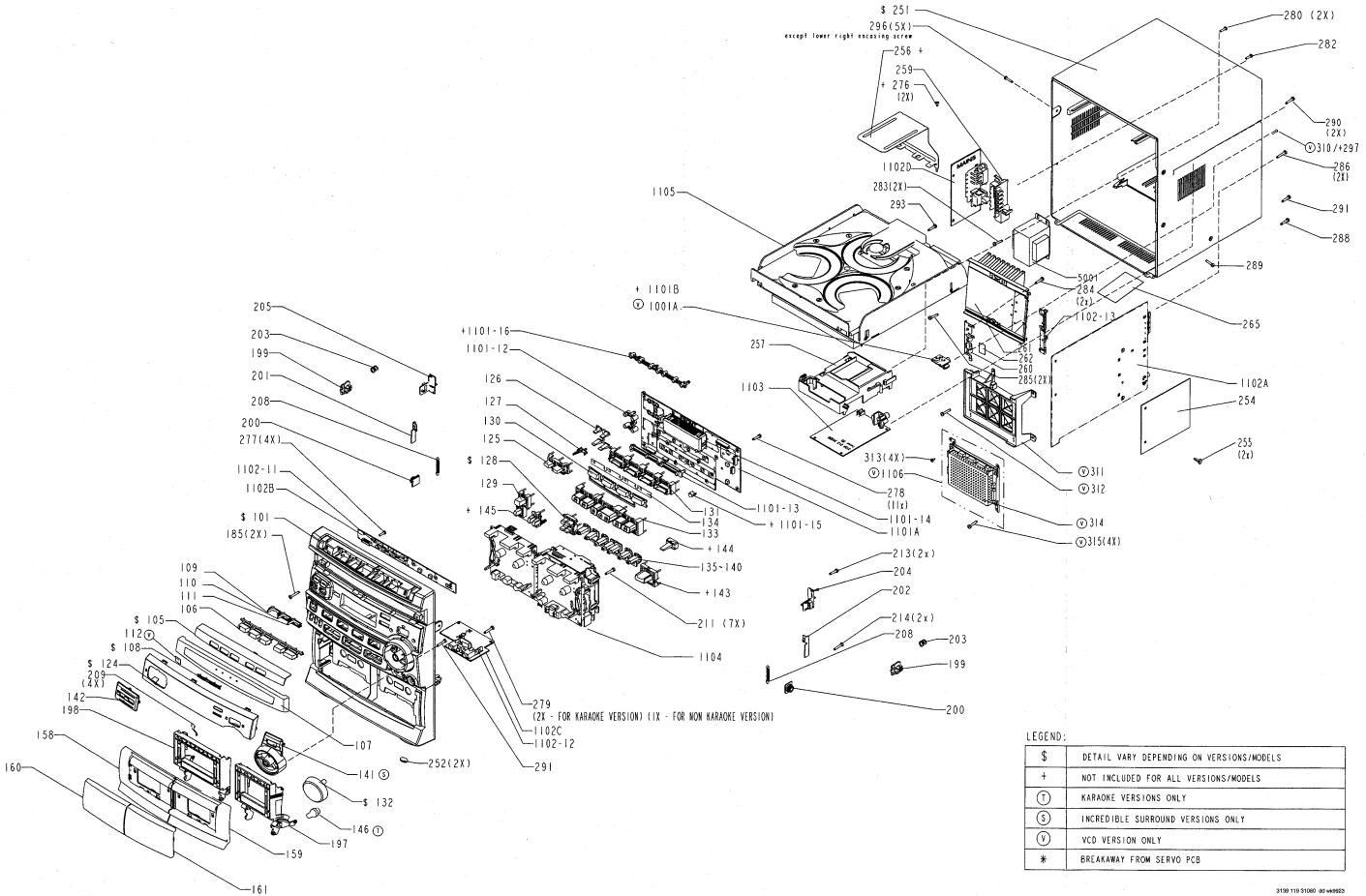
EXPLODED VIEW - MAIN UNIT



LEGEND:

$	DETAIL VARY DEPENDING ON VERSIONS/MODELS
+	NOT INCLUDED FOR ALL VERSIONS/MODELS
Ⓣ	KARAOKE VERSIONS ONLY
Ⓢ	INCREDIBLE SURROUND VERSIONS ONLY
Ⓥ	VCD VERSION ONLY
*	BREAKAWAY FROM SERVO PCB

3139 119 31060 dd wk9923

MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

101	4822 459 05265	Cabinet Front
105	4822 450 10608	Window CDC Control
106	4822 410 12232	Button CDC Select
107	3139 117 87540	Cover Tray CDC
108	4822 454 13035	Badge Philips
124	3139 117 89330	Wind. Disp. FW396C/22
124	3139 117 89690	Wind. Disp. FW391C/22
125	4822 410 12233	Button DSC/DBB
128	4822 410 12407	Button Set Clk-RDS
129	4822 410 12235	Button Power/Rec.
130	4822 380 10262	Lightguide Source Sel.
131	4822 410 12236	Button Set Source Select
132	4822 410 12237	Knob Volume Rotary
133	4822 410 11729	Button Set Controls
141	4822 442 01779	Cover IS
142	4822 442 01702	Cover DSC/DBB
143	4822 410 12325	Button IS
145	4822 410 12326	Button Replay/Rec
158	4822 443 11179	Cover Cassette Door Left
159	4822 443 11181	Cover Cassette Door Right
160	4822 381 12054	Lens Cassette Left
161	4822 381 12055	Lens Cassette Right
197	4822 443 10488	Door Cassette Right
198	4822 443 10487	Door Cassette Left
199	4822 402 10621	Push-catch
200	4822 529 10322	Damper Assembly
203	4822 492 11344	Spring Compression
204	4822 402 11246	Bracket Right
205	4822 402 11245	Bracket Left
208	4822 492 11345	Spring Tension
209	4822 492 42787	Spring Cassette
251	3139 114 67560	Cabinet Rear
252	4822 462 40683	Plate (Foot)
255	4822 466 93148	Spacer 5mm
260	4822 492 11734	Spring, IC
350	4822 445 10837	Loudspeaker FW396C/22
350	3139 118 77390	Loudspeaker FW391C/22
351	4822 303 50063	FM Aerial 75R
356	4822 219 10694	Remote Control
384	4822 303 50082	AM Frame Aerial
385	4822 321 10249 ⚠	Mains Cord
387	3139 116 19270	Instruct. for use FW396C/22
387	3139 116 19460	Instruct. for use FW391C/22
1451	4822 320 12604	Flex Cable 9pin 22cm
1455	4822 320 12654	Flex Cable 7pin 22cm
1456	4822 320 11974	Flex Cable 15pin 19cm
1557	4822 320 12663	Flex Cable 7pin 34cm
5001	4822 146 10949 ⚠	Mains Transformer

FW391C/22 LOUDSPEAKER BOX BREAKDOWN

4822 240 10307	Woofer 5,25" 6R 20-40W
4822 240 10306	Tweeter 2,5" 6R 100-140W
9965 000 00270	Cloth Frame Assembly

FW396C/22 LOUDSPEAKER BOX BREAKDOWN

4822 240 10369	Woofer 5,25" 6R 20-40W
4822 240 10371	Tweeter 2,5" 6R 100-140W
4822 464 10523	Cloth Frame Assembly

Note: Only the parts mentioned in this list are normal service spare parts.

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SCREW LISTS - MAIN UNIT

185	D3 x 12
211	D3 x 12
213	D3 x 12
214	D3 x 12
277	D3 x 12
278	D3 x 12
279	D3 x 12
280	D3 x 12
282	D3 x 12
283	D3 x 16
284	M3 x 15
285	D3 x 16
286	D3 x 12
288	D3 x 12
289	D3 x 10
290	D3 x 12
291	D3 x 12
292	D3 x 12
293	M3 x 6
296	D3 x 12
297	D3 x 12